MARINE REVIEW.

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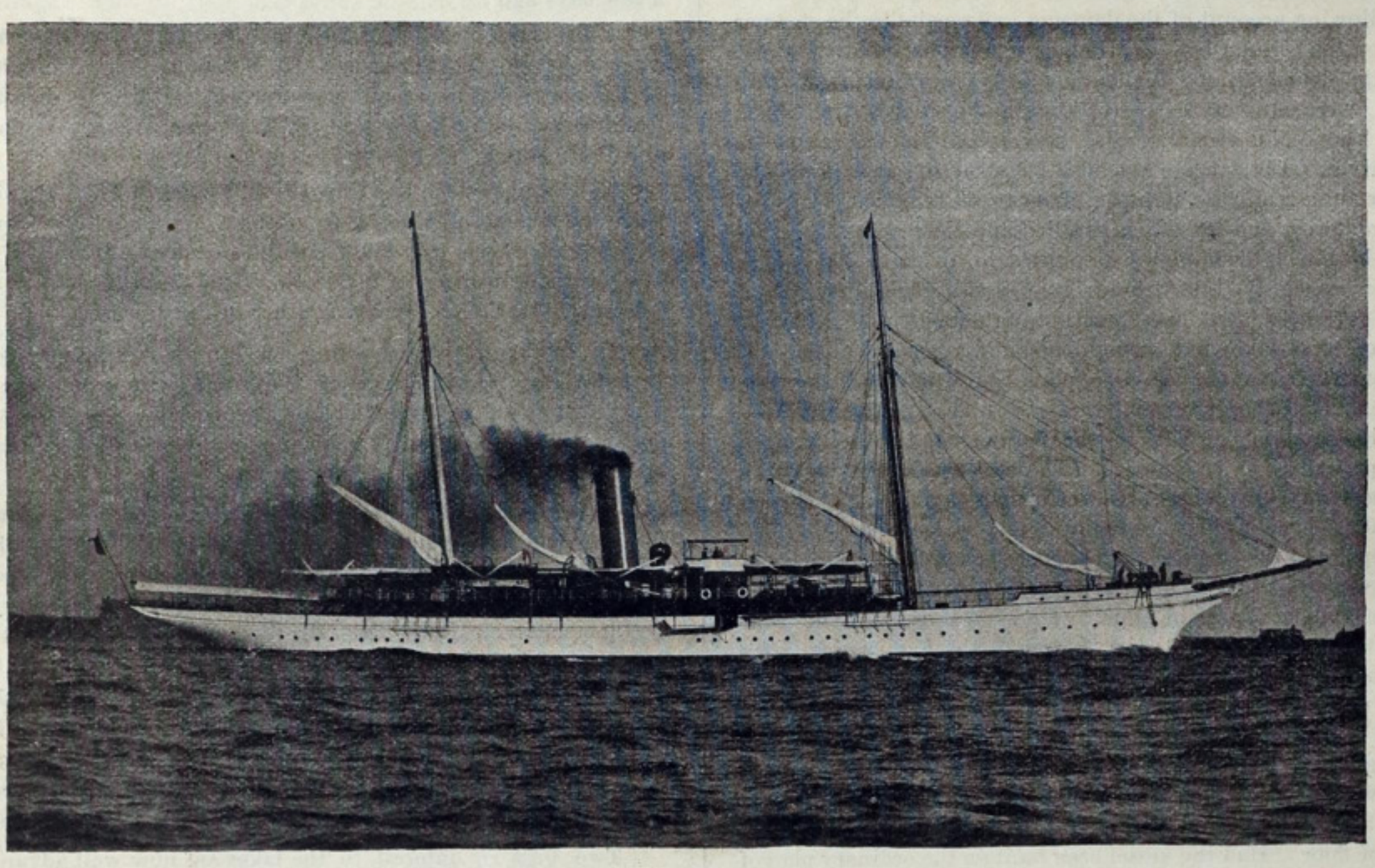
An American Millionaire's Yacht.

The steel steam yacht Margarita II, which is illustrated herewith, is said to be the most costly vessel of her class afloat. She is owned by Anthony J. Drexel of Philadelphia, and was built by the Ailsa Ship Building Co. of Troon, Scotland, from designs by Geo. L. Watson, who is famous as the designer of theValkyries and the Britannia. This vessel may certainly be called an American millionaire's home afloat, as it is estimated that $500,000 was expended in her construction and that it will cost $10,000 a month to run her. She left Philadelphia a few weeks ago on a voyage that will occupy the best part of a year, during which time all of the principal seaports in the Orient, India and China will be visited. According to arrangements for the voyage the first port visited was Bermuda. From there the yacht was to go to the Azores, thence to Gibraltar. After visiting Gibraltar, Nice, Genoa, Naples and other points in the Mediterranean, she is to pass through the Suez canal into the Red sea, and later up the bay of Bengal to Madras and Calcutta. On her way south from there she will call at Singapore, going thence to Hong Kong, several other ports in China and some in Japan. She will return by much the same route to the Mediterranean and the Riviera, where the British yachts will race next spring, and it is expected she will be able to reach Newport next August in time to join the fleet of the New York Yacht Club on their cruise. The principal dimensions of this yacht are 278 feet over all, 239 feet water line and 35 feet beam. She draws 16 feet of water with all stores and coal on board. Of the latter, she carries 380 tons in her bunkers, sufficient to run her at a speed of twelve knots for fifteen days. Two quadruple expansion engines, built by David Rowan & Co., of Glasgow, drive the twin screws with which she is fitted. The cylinders are 15½, 22, 31 and 44 inches in diameter respectively, with 27-inch piston stroke. To guard against the invasion of pirates the yacht is equipped with two rapid-firing guns of modern make, two dozen muskets fitted with sword bayonets, and the same number of revolvers of 44 calibre and English army pattern. Her steering gear, windlass, capstans and winches are all run by steam, and besides her main engines she has at least a dozen other other engines for various purposes, including a refrigerating machine, air and fire pumps, and two dynamos of the most improved pattern.

Everything that modern ingenuity can devise for the comfort of the ocean traveler has been supplied in this vessel. The main dining saloon is 31 feet wide and 20 feet long and will seat some fifty persons. A feature of the yachts construction is what is known as the sun deck. It is really a promenade deck 198 feet long, extending out to the rail on each side, and without any obstruction other than the funnel, the chart house under the bridge and the engine room sky-light. In the tropics double awnings will be spread over this deck. An idea of the size of apartments in the yacht, as well as the great expanse of open deck just referred to, may be gained from the fact that at a farewell ball given aboard the vessel before her departure from Philadelphia there were several hundred guests present. The finish of dining room and other principal apartments is mainly dark mahogany. For some of the decorations a force of skilled Venetian workmen was employed. One device in the owner's stateroom indicates the completeness, or probably the extreme, of arrangements that have been made with a view to comfort on the vessel. On one side of the bed, close to the pillow, is set a cylindrical shaped apparatus, called a homacoustic. It consists of a series of rubber tubes, the ends of which contain a telephonic receiver and sender, which may be placed in position at the owner's ear and mouth without his leaving the pillow, much less the bed. By this system he can communicate with the captain on the bridge, the engineer in his room, the steward or the pilot.



MARGARITA II, OWNED BY A. J. DREXEL, PHILADELPHIA, PA.

At the anual meeting of the Hopkins Steamship Co., held Tuesday at St. Clair, Mich., the following board of directors was elected: F. W. Wheeler, Mark Hopkins, E. C. Recor, H. E. Schmuck, John Green and Richard P. Joy. The directors organized as follows: F. W. Wheeler, president; H. E. Schmuck, vice-president; E. C. Recor, secretary, and Mark Hopkins, manager. The St. Clair Steamship Co. on the same day elected the following directors: Wm. G. Mather, Samuel Mather, E. C. Recor, J. H. Wade, E. R. Perkins.

Channel System of Construction.

The latest supplement to the United States Standard Register of shipping, for which Sinclair Stuart is the chief surveyor, contains a report on the channel system of construction, which has been adopted in a large number of steel vessels on the lakes. Mr. Stuart, who has been engaged by lake vessel owners to supervise the construction of vessels classed in the Standard register, introduced this system of construction. In this report he submits to the officers of his association, and through them to the underwriters with whom they are associated, certain claims in support of the channel method. The report will probably bring out some comment from ship builders who are not entirely in accord with Mr. Stuart's views as to the merits of the channel system. He says :

"In my report to you, dated August 23, 1895, in regard to the channel system of construction, I spoke of the effect of grounding or stranding on vessels of this construction, as follows: 'It has been found by actual experience that the damage to the bottom of the channel vessel is of a purely local nature and does not spread and affect other parts of the structure at a distance from the point of contact as readily as in vessels of the ordinary construction, and can be more readily and cheaply repaired.' A most convincing proof of the truth of this statement has been furnished during the past season of navigation, two large steel steamers, one built on the channel system under the association's rules and the other on the cellular bottom system, having grounded under very similar circumstances and both having to be placed in dry dock for repairs.

"The following account of the damages and repairs to the steamer constructed on the cellular bottom principle was published at the time: 'Repairs on the steamer L. C. Waldo, made by the Cleveland Ship Building Co., were of a very extensive kind, and a record was made on the job. The Waldo struck several days ago at the Encampment in the Sault river. The damage extended for about 210 feet along the bottom of the ship, requiring eighteen plates to be removed, eight of which were renewed, and the others rerolled and replaced. The surface covered by the eighteen plates amounted to about 18,000 square feet. There were eighty-eight frames bent and broken, fifty-six of which were renewed, the rest being straightened and replaced. Forty-six floors were taken out, straightened and replaced. The bottom being constructed on the cellular plan, the inside damage was much more extensive than the number of plates taken off would indicate. The longitudinal girders in the bottom were badly damaged and several plates had to be renewed. The boat was in the dry dock only eight days and eight hours. In the course of this work between 30,000 and 40,000 steel rivets were removed and replaced.'

"The repairs to the steamer W. D. Rees (channel construction), the other vessel referred to, as officially reported to the association by the superintendent in charge of same, were as follows : 'The starboard plates taken off were B 3, 4, 5, 6 and 7, three of which were replaced by new ones ; thirty-six channel floors bent, bent pieces cut out and part new channels put in. Port side plates B 4, 5, 6, 7 and 13 , A 14, C 4, E 13 and 14, all of which went back except B 5, 6 and 7; twenty-eight channel floors bent, bent pieces cut out and replaced with part new channels. None of the new pieces of floor exceeded 42 inches long, all of which were connected with channel butt straps on reverse side of floor. Had the vessel been built on the ordinary plan of floors, i. e. plate and angles, the whole bottom would have been ripped from end to end. This goes to show that the channel system of build is the best and strongest for all vesesls that are so liable to bottom damages as our lake vessels.'

"From these reports it will be seen that the claim made for the channel system of construction, that the damages received from grounding or stranding will be of a purely local nature, instead of spreading and affecting other parts of the structure at a distance from the point of contact, etc., is fully justified. It will also be seen that the damage actually received by the W. D. Rees was more readily and cheaply repaired than would have been the case with a vessel of ordinary plate and angle-bottom construction. I would also instance the case of the steamer Queen City (channel construction), which grounded during the past season and had forty-six channel floors bent in consequence, with eighteen plates in connection that had to be taken off and straightened. These forty-six channel floors were all heated and straightened in place, none having to be removed or renewed. The steamer Kearsarge (channel construction) in May, 1895, while running at full speed with a full cargo of iron ore, grounded at the head of Hay lake channel and had to take off between 300 and 400 tons of cargo before being released. Twenty-five bottom plates were broken, bent or indented in consequence; forty-six frames were broken at lower turn of bilge; thirty-eight floors fractured and other damages received in the immediate location only. The channel floors were straightened in place and repaired by having new ends fitted. The total cost of all repairs was $8,700. The cost of these repairs was less by $10,000 than the repairs to the Centurion, a steel steamer with cellular bottom which had practically the same experience as the Kearsarge in grounding at about that time.

"As the association, by providing rules governing the distribution of material under this system of construction and accepting for classification vessels built in accordance with same, has encouraged the building of vessels of this construction and is therefore interested in its complete success, I am pleased to be able to submit this evidence of not only its inherent strength, but of the less serious nature of damages resulting from grounding and the readiness and economy with which such damages may be repaired. Where, as in the case of our lake service, vessels are so liable to ground, this is of very great importance to the underwriters who have given us their support."

Around the Lakes.

Capt. G. N. Spencer, who was some years ago engaged in sailing steamers and large river tugs on the upper lakes, but who has of late been engaged on the St. Lawrence river, died at his home in Oswego a few days ago.

Officers and directors of the Minch Transit Co. of Cleveland, elected a few days ago, are: President, H. D. Coffinberry; vice-president, V. T. Palmer; secretary and treasurer, P. J. Minch; directors, H. D. Coffinberry, John B. Guthrie, V. T. Palmer, Capt. William Gerlach and P. J. Minch.

The family of the late Capt. J. B. Symes of Port Huron acknowledge the receipt of a letter from the Cleveland-Cliffs Iron Co. commending his services as master of the steamer Cadillac and expressing sorrow upon hearing of his death. The Cadillac will be sailed next season by Capt. Geo. Symes, brother of the deceased.

In the work of inspecting machinery for the new Great Lakes Register, Mr. Walter Miller of Cleveland will soon have under his charge three or four practical engineers, who will visit the various ports and if possible report upon the machinery of every vessel on the lakes before the opening of navigation.

Rumors of John Gordon arranging to charter or buy a couple of the steel steamers of the Menominee fleet of Cleveland have again been revived, but there is absolutely nothing in the reports. It is understood, however, that Mr. Gordon has made satisfactory terminal arrangements on Lake Erie for the steamer Globe for the coming season.

Practically all of the statistics contained in the report of St. Mary's canal traffic for 1896, which has just been submitted to congress by the secretary of war, was contained in monthly reports published throughout the season by the Marine Review and finally collected in a summary for the year, which was printed in December last.

Two bills of interest to the lakes are now well advanced in the present congress and will very probably be passed within the present month. One of them provides for a life saving station at Fort Gratiot and the other authorizes the construction of a light and fog signal station, to cost $75,000, at the outer terminus of the straight channel entrance to Maumee bay and river.

Beyman Bros. (John and Eugene) of Toledo are the lowest bidders on a job of dredging in Boston harbor that will involve an expenditure of about $1,145,000. Under the firm name of Geo. H. Beyman & Bro. the Toledo contractors have been engaged on a profitable section of the 20-foot channel work on the lakes, and they have an extensive plant for work of this kind, but if they are to undertake the Boston contract it will probably be necessary to build new dredges on the coast.

A Very Desirable

train to take when going to New York is Pennsylvania No. 6, leaving Union station 1:40 p. m. daily and from Euclid avenue 1:50 reaching New York 7:40 next morning. Pullman sleeper through without change. Supper served in dining car. Apl 15

Pertaining to Next Season's Business.

On account of the depressed condition of all branches of the iron business, and the entire absence of anything in the way of transactions in iron ore that might be expected to cause preparation for vessel contracts, most of the vessel owners have thought it advisable to refrain from comment on the outlook for the coming season. The association of Bessemer ore dealers has been holding meetings in Cleveland within the past week, however, and this has caused some speculation as to prices of ore and the effect upon the lake freight market of any action that might be taken in this regard by the agents of the ore companies. But these meetings have resulted in absolutely nothing more than a unanimous agreement among the ore dealers to make no effort to open up negotiations for business under present conditions. The ore dealers are making no secrets of their conclusions. Mr. L. C. Hanna, who is one of the executive officers of the association, and who is also largely interested in vessel property, said that the talk of an 80-cent freight rate from the head of Lake Superior at this time has no more significance than anything that might be said of a dollar rate or a 40-cent rate.

"It is quite probable," he said, "that the Bessemer ore dealers' association will be continued through the coming year, but there has been absolutely nothing done towards the establishment of prices. The element in the association known as the producing-consuming element, that is where furnaces and mines are controlled by the same interests, is now a very important factor to deal with, especially on the Mesabi range. This problem may prove so difficult of adjustment that the Mesabi properties will not be included in the association another year, but aside from questions of this kind it is agreed that it would be useless to attempt to fix prices of ore on a pig iron market that is based on $9.50 a ton. We can hold off for two, three or four weeks, or even two months, and must do so in order to serve both our own interests and the interests of customers. There has been some expectation of a reduction in rail charges between mines and shipping ports. Such a reduction would help to meet the demand for lower prices, but the ore producer can not go to railway managers and ask for a reduction now. He would be told to await a settlement of the present unsatisfactory state of affairs in the iron market, and until there was some hope of doing business. This is an instance of the causes that are prompting delay."

It will be seen from this interview that there is no hope of contracts being made between ore dealers and vessel owners for some time to come, and that there is nothing to be gained now by talking of rates of any kind. Unless the iron market improves before the opening of navigation it is quite evident that contracts will be made at figures that will probably be as low as have ever been accepted by vessel owners, but there is no telling what changes may occur in the general business of the country before the first of April. Several rumors of big sales of steel on foreign account have been heard during the the past few days but none of them are pronounced authentic. One is to the effect that the Carnegie company has sold 200,000 tons of billets and that engagements of vessels to move this steel have caused a further scarcity of tonnage at New York and other points.

It has already been noted that vessel owners have not a great deal to expect from the wheat movement out of Duluth during the coming spring and summer. Late advices from the head of the lakes are to the effect that agents of the whalebacks have taken quite a large amount of Duluth grain for delivery at Buffalo at 2 cents. A letter from one of the principal Duluth brokerage concerns is as follows:

"The quantity of grain in store in Duluth is at this time is about 7,500,000 bushels, of which only about one-half is wheat. A year ago at this date there were about 9,500,000 bushels of wheat alone, and about 3,000,000 bushels of coarse grain. But the quantity of grain in the country elevators tributary to Duluth is estimated to be not nearly so large this winter as it was in the winter of 1895 and 1896. About 1,250,000 bushels of grain has been contracted for spring shipment. Of this grain nearly one-half will go to Lake Ontario. Buffalo charters have been made on a basis of 2 cents and the Lake Ontario charters at 3½ cents, vessels to pay canal tolls. All the Buffalo charters were made for a large iron concern in Cleveland, who have about twenty-five spot boats on this market. Until these spot boats are disposed of, there will probably be very little inquiry for tonnage to arrive. Shippers have, however, been bidding 1¾ cents on Buffalo boats to load within fifteen days after the opening of navigation. There seems to be some dispute as to the quantity of grain in the country available for early shipment. Our largest elevator manager maintains that there are yet several millions to go forward, while other elevator concerns declare we will see comparatively little more wheat until the new crop. At any rate it is almost safe to estimate that the quantity of wheat to go forward from the port of Duluth from the opening of navigation to Sept. 1 is not more than half as great as during the same period in 1896. The coal movement from this port up to the last fortnight had been rather slow, but the protracted low range of temperature has stimulated this movement to a considerable extent. Although it is rather early to anticipate what the condition of the coal docks will be at the opening, we incline, at the present time, to believe that there will be very low stocks when the first boat arrives."

Two cents on wheat is equal to only 74 cents on ore, while 1¾ cents on wheat is equal to only 65.3 cents on ore.

To Visit England.

Secretary Francis T. Bowles of the Society of Naval Architects and Marine Engineers makes the following announcement to members of the organization under date of Jan. 22:

"Under date of Dec. 21, 1896, the president of the Institution of Naval Architects, 5 Adelphi Terrace, London, W. C., invited the Society of Naval Architects and Marine Engineers to visit England towards the commencement of next July to attend an international congress of naval architects and marine engineers in London, under the honorary presidency of His Royal Highness, the Prince of Wales, to celebrate the sixtieth reign of Her Majesty, Queen Victoria. By direction of the council, given at a special meeting held on the 21st inst., the president has accepted this invitation for the society. Members who propose to attend the congress are requested to notify the secretary at their earliest convenience. The executive committee, charged by the council with such detailed arrangements as may be necessary, will further communicate through the secretary with members who signify their wish to accept this invitation."

Gen. Wm. P. Craighill, chief of army engineers, who retired a few days ago under the forty years' service law, was one of the ablest and most distinguished of engineers who have been in charge of river and harbor and fortification works throughout the country. He would have been retired in a few months for age, but he preferred a voluntary retirement. His entire service has been with the corps of engineers. He has been chief of the corps for two years past. His successor, Gen. John M. Wilson, is well known on the lakes. He was at one time division engineer with headquarters in Cleveland. He served first in the ordnance department as an artillery officer and was twice brevetted, captain and major, before his second year in the service had been completed. He was transferred to the engineer corps during the latter part of the war and received three brevets for services around Mobile.

Much as we may regret it there is one important point in favor of Great Britain and Canada that must not be lost sight of in discussing the question of abrogating the agreement which prevents the building of war vessels on the lakes. The St. Lawrence canals, which form the only connection between the lakes and the seaboard that will admit of the passage of torpedo vessels and small gunboats, are open to our merchant vessels, but would Great Britain consent to allowing war vessels of any kind to pass through these canals? Probably not, unless it might be under a proposition that would disturb the entire canal regulations now existing between the two countries. This was the snag struck by Senator McMillan when he went into this question very thoroughly a few years ago.

A statement published recently by the Insurance Company of North America, which conducts a large business in both hulls and cargoes on the lakes, indicates a prosperous business during 1896. The company's income during the year aggregated $5,865,173.39, as against a total of $5,190,453.68 in expenditures, or an excess of $674,719.71. Assets on Jan. 1, 1897, footed up $9,651,808.08, and the surplus as regards policy holders on the same date was $5,319,773.52. Both of these items also show a material increase over January, 1896.

Capt. George Stone, Cleveland vessel owner, is at Thomasville, Ga. Mrs. Stone, who is also at Thomasville, has not been in very good health of late.

Ship Yard Matters.

Officers of the Goodrich Transportation Co. of Chicago again talked of a new steamer at their annual meeting, which took place a few days ago, and it is again said that they will build a passenger steamer to cost about $200,000 and to be ready for the opening of navigation in 1898. Plans which they have under consideration call for a steamer 235 feet long, 35 feet beam and 16 feet moulded depth, to be similar in most respects to the Iowa, which was brought out last season. Engines proposed for the vessel are of the triple expansion type and of about 1,500 horse power, with two Scotch boilers of 12 by 14 feet, allowed 175 pounds steam pressure. The election of officers at this meeting resulted as follows: President, A. W. Goodrich; vice-president, E. L. Upton; secretary, F. C. Reynolds; assistant secretary, H. W. Thorp; treasurer, W. J. Lauderbock; superintendent, J. W. Gillman. These officers with T. O. Lowden of Chicago make up the board of directors. The steamer Cheboygan, owned by the Goodrich company, is undergoing repairs in Burger & Burger's dry dock Manitowoc. She is to receive numerous new frames, new keelsons, main deck beams and deck, arches, bed timbers for engine, entire new ceiling, outside plank from light water line up, and thorough re-caulking throughout. This work will make the hull of the steamer practically new.

F. W. Wheeler & Co. of West Bay City have begun work on the new steel steamer that is to be managed by J. L. Crosthwaite of Buffalo, and in which Mr. Crosthwaite is interested with Lewis A. Hall and others. The boat will be single-decked but her construction and general equipment will be in all respects equal to the larger and more costly freight steamers on the lakes. She will have a double bottom for water ballast, but it has been decided, on account of the shallow water in the trade in which she will be engaged, to also sheath her bottom with oak timber. She will have steel spars, steam windlass and capstans, stockless anchors, electric light plant, improved pumps and other late appliances. Her dimensions are 281 feet over all, 266 feet between perpendiculars, 42 feet moulded beam and 19 feet moulded depth. Engines will be of the triple expansion vertical kind, with cylinders 17, 29 and 48 inches diameter by 36 inches stroke. There will be two Scotch boilers, 11 feet diameter by 12 feet long, allowed 170 pounds steam pressure. Each boiler will have two furnaces of 42 inches diameter. It is expected that the vessel will carry 2,500 net tons on 12 feet 10 inches draft.

William Jacobson of Chicago, who is said to have been connected with the establishment of the line of car-carrying tow barges on Lake Michigan between Chicago and Peshtigo, is in Detroit endeavoring to enlist capital in the construction of barges for similar service, mainly in the coal trade, between Toledo and Detroit. The scheme is as yet simply under discussion. Nothing has been done towards forming a company.

Mr. A. B. Wolvin's steamer Crescent City, building at South Chicago, was launched Tuesday. Preparations are being made at the works of the Cleveland Ship Building Company to launch the Wilson line steamer, another of the 400-footers, about the 17th inst.

James Pullar will build at Sault Ste. Marie a tug for Marks & McDonald of Port Arthur, Ont. The tug will be 47 feet long, 12 feet beam and 7½ feet deep. The engine and boiler of the tug Minnie Kidd are to be utilized. The cost of the hull is placed at $2,000.

Directors of the firm of F. W. Wheeler & Co., recently elected, are: F. W. Wheeler, F. B. Chesebrough, H. T. Wickes, S. T. Crapo, H. M. Gillett and C. W. Stiver.

The wooden steamer that is being built by the Jenks Ship Building Co. at Port Huron will be about the size of the H. E. Runnells. It is expected that she will be finished upon the opening of navigation.

Yachting, an illustrated weekly published by the Burgee and Penant Co., World building, New York, has appeared of late in magazine form with an elegant new cover. The change is a decided improvement in a publication that had already met with general favor in yachting circles, on account of a careful selection of matter and the high quality of its engravings.

Engineer H. C. Higgins, Baltimore, is said to be preparing plans and specficatons for a new screw steamer of some 2,000 tons gross, for the Baltimore, Chesapeake & Richmond Steamboat Co., and the contract for her construction will be awarded very soon.

Production of Pig Iron in the United States.

From official reports made by manufacturers to the American Iron and Steel Association it is learned that the total production of pig iron of all kinds in the United States during 1896 was 8,623,127 gross tons, a decrease, when compared with the year 1895, of 823,181 tons. But when the returns are considered by half yearly periods it is found that during the twelve months embracing the last half of 1895 and the first half of 1896 the grand total of 10,334,986 tons was attained. This marks the largest production of pig iron in this or any other country for any like period of twelve consecutive months. The diminished yield for the latter part of last year—3,646,891 tons—was influenced to a great extent by the uncertainty incidental to the presidential campaign, and as to the finances of the country. Of Bessemer pig iron the furnaces of the country produced in 1896 a total of 4,654,955 tons, or a decrease of 968,740 tons from the previous year. While the increase in the production of pig iron in 1895 over 1894 may be ascribed to the demand for Bessemer pig iron created by the extraordinary employment of structural steel, the decrease in 1896 may be attributed to a lessening in the demand for steel of this kind, and also for steel rails. On Dec. 31, 1896, the unsold stocks of pig iron held by manufacturers or their agents, and not designed for their own consumption, amounted to 711,649 tons, against 644,887 tons on June 30, 1896, and 444,332 tons on Dec. 31, 1895. These amounts do not include pig iron sold but not removed from the furnace banks, nor that made at rolling mills for their own use. To the above quantity there should be added 136,037 tons in the yards of the American Pig Iron Storage Warrant Co., which had passed from the hands of the makers, making 847,684 tons which may be considered as having been on the market at the close of 1896.

Death of Hugh McMillan.

Hugh McMillan, western agent of the Western Transit Co., whose death is announced from California, was probably the best known vessel man in Chicago. It was Mr. McMillan's custom to spend a part of the winter on his olive grove near Ventura, Cal. He was about to return to Chicago when he met death by drowning in Santa Paula creek. He was being driven to town in a closed carriage. The stream was being crossed at a ford. The current overturned the carriage, and it was swept down stream. The doors were closed and there was no chance for Mr. McMillan to escape. The coachman secured assistance and the body was easily found. It will reach Chicago for burial on Saturday on the same train on which Mr. McMillan was expected to arrive.

The Western Transit Co. is the veteran lake line. It is the lake end of the New York Central Railroad, and it will thus be understood that Mr. McMillan's position in Chicago was an important one. He was one of the best known men on the Chicago board of trade. He had been with the Western Transit Co. most of his manhood days. He was born in Scotland fifty three years ago, and came to this country when a child. After sailing before the mast for a short time, he entered the employ of the Western line in 1862, beginning as second mate on passenger steamers between Chicago and Buffalo. Then for a time he was master of a schooner, returning to the transit company as assistant agent under J. W. Tuttle. In 1884, Mr. McMillan became western agent, which position he held until his death.

Not long ago the Buffalo Forge Co., Buffalo, N. Y., got out a 400-page library bound catalogue, dealing in a most elaborate manner with information regarding the application of blowers and exhausters and the fan system of heating, ventilating, drying, etc. The demand for the book has been such that the edition has been practically exhausted, at least as regards supplies for people who are not actually purchasers of material embraced in the Buffalo company's output. In order to meet a demand from technical schools, engineers and others who are interested in the infomation contained in the book, but not directly in the purchase of engines, blowers, etc., it has been decided to issue a pocket edition. So far as the text is concerned, the new edition will be a duplicate of the larger book.

Captains Bernard Nelson and Henry Stone, both of Cleveland, will be new men in steamers of the Bessemer line next season. Capt. Fred Graves, who was in the steamer W. H. Wolf last season, will take the steamer Harper out in the spring, and Capt. Mills, who sailed the Harper last season, will command one of the big Wolvin steamers.

Lorain Ship Building Plant.

A FULL STATEMENT OF THE CLEVELAND SHIP BUILDING CO'S PLANS FOR NEW WORKS AT LORAIN—A DRY DOCK AND BERTHS FOR FIVE SHIPS.

Immediately following the annual meeting of the Clevelnd Ship Building Co., Thursday, General Manager James Wallace gave out a statement of all arrangements that have been made for the new plant at Lorain. It is as follows:

"At a meeting of the stockholders of the Cleveland Ship Building Co., Thursday, Feb. 4, 1897, it was decided to increase the capital stock of the company from $500,000 to $1.000,000, and to establish a steel and wooden ship building plant and dry dock at Lorain, O. The company has secured for this purpose twenty acres of land on the east side of Black river, about 200 feet south of the road bridge, which, in the opinion of the officers of the company, is one of the most desirable pieces of ground for a plant of this kind anywhere on the chain of lakes. It is particularly well situated for a dry dock, as it is not quite one-half mile from the pier entrance to the entrance of the dry dock. Black river at this point is 400 feet wide and 25 feet deep, and it is well known that there is not a better harbor on Lake Erie than the harbor at Lorain. There are times when a vessel can get into Lorain but can not make the harbor at Cleveland. A steamer 500 feet in length of the latest type could enter this harbor and steam into the dry dock with her own power, not requiring the use of tugs in any way. It is true that she would have to go through one bridge, but there is 90 feet in the clear between the abutments on each side of the bridge. After work of any kind had been completed on the vessel in dock, she could steam out again without the assistance of tugs, which, in the opinion of vessel men generally, would be a great advantage to the dock. Then again, boats that might be disabled and have to unload at Erie, Conneaut, Ashtabula, Fairport or Cleveland, or in fact any of the lower ports on Lake Erie, could as readily go to a dock at Lorain as they could go to a Cleveland dock. It is directly on their way up the lakes, being only about five or six miles out of a straight line from Cleveland to Detroit.

"It is the intention of the company to build a dry dock that will be 560 feet long, 106 feet wide at the top, 60 feet wide at the bottom, and 20 feet deep, having a gate that will be 66 feet wide and provided with pumping capacity of about 90,000 gallons per minute, which would empty the dock in an hour. It is also the intention to establish a ship building plant with berths suited to building five 500-foot ships at one time. All of the machinery in the yard and adjoining buildings, as well as at the dry dock and in the joiner shop, machine shop, etc., will be driven by electricity from one central power station, which will be located alongside the railroad track and the water, so as to permit of the use of condensing engines, and so as to deposit fuel right in the coal bins in front of the boilers.

"The plant will have a siding direct from the C. L. & W. and Nickel Plate railways. Everything that it is possible to handle with cranes will be so handled and the cranes will be driven largely by electrical power. Compressed air will be used for cranes over tools, riveting machines, etc. In order to arrange for the building of five ships at once, the company will put two slips into its property, each 550 feet long and 125 feet wide. Dock room will be provided near the plant for from thirty to forty ships of the largest class, so that a big fleet may be laid up at Lorain during the winter and be given the best of accommodations for repairs, as well as the necessary fit-out in the spring. It is hoped to have the plant ready for operation inside of a year. Contracts have already been let for all the piling, sheath piling, etc., and arrangements for the necessary dredging will be made within a few days. It is not the intention of this company to make any changes or removals from its present machine shop, boiler shop, foundry or blacksmith shop in Cleveland. The plan is to be prepared in Cleveland at all times to take care of repairs as in the past, both as regards hulls and machinery. The company intends to maintain enough tools at their present ship yard to take care of anything that may come to them in repairs in any of the dry docks or aboard any of the boats in Cleveland. In fact, the Lorain project is only an enlargement of the ship yard capacity, with the addition of a dry dock, which it was thought was necessary from the standpoint that there were not enough dry docks to take care of the business on Lake Erie."

A photograph of the largest boat on the lakes, the Sir Henry Bessemer, will cost you only $1.50. Write the Marine Review.

Publications.

In a book of 200 pages, handsomely illustrated, and entitled "The Ship's Company and other Sea People," Lieut. Commander J. D. Jerrold Kelly, U. S. N., has grouped a half dozen short stories that will prove especially interesting to anyone who has a knowledge of vessels or shipping matters. A description of the life and duties of the ship's company of a great Atlantic liner is followed by a story of a New York Yacht Club cruise, in which some of the yachts are described and considerable information given in regard to the cost of running them, etc. Under the heading "Midshipmen Old and New," the author deals with improvement in the service of these youngsters. Other chapters describe sea service from the last century to the present time and deal also with the superstitions and queer pets of sailors. Harper & Bros., New York, are the publishers.

Attention has been directed to the Philadelphia Museum through an application from the mangement for a copy of the Marine Review to be filed regularly in the library of the institution with other trade papers of the world. The object of this museum is to keep people of this country in touch with the world's trade. Huge halls are filled with the world's products—samples of goods such as Europe sends to South America, Australia, etc. These are all put at the disposal of manufacturers eager to study methods of extending trade. The success of the system surpasses anything dreamed of by the promoters of the scheme. Catalogues, pamphlets and reports pertaining to the work of the museum will interest manufacturers or merchants. They may be had upon application.

A series of small books issued by Charles Griffin & Co., Limited, of London, and published in this country by the J. B. Lippincott Co., has been designed to meet a demand from officers in the seagoing mercantile marine for a more scientific insight into the principals of their profession. One of the books, just received from the Philadlephia publishers, is entitled, "Navigation—Practical and Theoretical." It is an elementary manual in navigation, written with a view to interesting the beginner as well as the practical navigator. It is understood, of course, that such works are are not of a great deal of interest to men sailing the lakes, although they are of the highest importance to officers of seagoing vessels.

A book of tables for constructing ship's lines has been received from Archibald Hogg, naval architect, of Norham House, Whitley, Northumberland, England. The tables give the required displacement and longitudinal position of the center of buoyancy, and Mr. Hogg states that he has used in actual practice in the drawing office for years, and can vouch for their accuracy and usefulness. In order to have the tables suited to a great deal of handling, the binding is of a strong kind in leather.

An album of designs for small boats, canoes and yachts, gotten up by Fred W. Martin, yacht designer of Racine, Wis., contains some sixty-five views of pleasure crafts of various kinds, all made from working drawings and intended for the purpose of helping prospective builders of such vessels in their work. Mr. Martin undertakes, by correspondence and otherwise, the design of all kinds of yachts. steam or sail, as well as every description of small boats.

When the Tonawanda Iron & Steel Co. opened its big Niagara Furnace B in November last, the fire was started by an electric spark resulting from the touching of a button by President-elect McKinley at his home in Canton. A souvenir of the event, which has just been published, contains about a dozen beautiful photo-gravure views of the furnace and its surroundings.

A collection of twenty or more large half-tone engravings of the latest ships of the United States navy, neatly bound, has just been received from Castner & Curran, Board of Trade building, Columbus. Castner & Curran are general agents for Pocahontas coal and the vessels are those on which their coal has been used for trial trips.

"Capt. Gore's Courtship," is the title of a short but interesting sailor yarn, written by T. Jenkins Haines, and published by J. B. Lippincott Co., Philadelphia. Some of the characters are of the kind that will always be spoken of when reference is made to the sailing vessels of time past.

T. S. & J. D. Negus of No. 140 Water street, New York, have just issued their nautical almanac for 1897. This work is now in its fifty-eighth year.

MARINE REVIEW

DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 409 Perry-Payne building, Cleveland, Ohio, by John M. Mulrooney and F. M. Barton.

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The books of the United States treasury department on June 30, 1896, contained the names of 3,333 vessels, of 1,324,067.58 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1896, was 383 and their aggregate gross tonnage 711,034.28; the number of vessels of this class owned in all other parts of the country on the same date was 315 and their tonnage 685,204.55, so that more than half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1896, was as follows:

	Number.	Gross Tonnage.
Steam vessels	1,792	924,630.51
Sailing vessels and barges	1,125	354,327.60
Canal boats	416	45,109.47
Total	3,333	1,324,067.58

The gross registered tonnage of the vessels built on the lakes during the past six years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30. 1891	204	111,856 45
" " " 1892	169	45,968.98
" " " 1893	175	99,271.24
" " " 1894	106	41,984.61
" " " 1895	93	36,352.70
" " " 1896	117	108,782.38
Total	864	444,216.36

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (*From Official Reports of Canal Officers.*)

	St. Mary's Falls Canal.			Suez Canal.		
	1895*	1894	1893	1895	1894	1893
No. vessel passages	17,956	14,491	11,008	3,434	3,352	3,341
Tonnage, net registered	16,806,781	13,110,366	9,849,754	8,448,383	8,039,175	7,659,068
Days of navigation	231	234	219	365	365	365

* 1895 figures include traffic of Canadian canal at Sault Ste. Marie, which was about ¼ per cent. of the whole, but largely in American vessels.

There is always pending, in one house of congress or the other, a Nicaragua canal bill. The senate has given up the greater part of the past two weeks in discussing the bill that was before the house during the last session, but there is little hope now of important action of any kind under the present administration. The latest move in the matter is the introduction, by Mr. Vilas, of a substitute for the bill providing for the appointment of another commission, to be composed of one member of the engineer corps of the army, a naval engineer and three other citizens of the United States, to be nominated by the president and confirmed by the senate. The commission is to be known as the inter-oceanic canal commission and the members are to be paid at the rate of $500 per month. It is proposed to have this commission visit and personally inspect the several lines and routes projected, or which may seem to be sufficiently practicable to demand an inquiry for an inter-oceanic canal to connect the Atlantic and the Pacific oceans. They are required to make surveys etc., to determine the most feasible, practical, and economical route for the canal and to submit plans and specifications, estimates of cost, etc., for the same. An appropriation of $1,000,000 would be required for this work, and it may again be said, therefore, that there is little hope of passing even the substitute.

Citizens of Duluth and Superior who are preparing to oppose, during the coming season, all Sunday work in loading or unloading freight vessels at the head of Lake Superior, need have no fear of open opposition from vessel owners, or from the influence of any interest at lower lake ports that may be connected with mines or docks in the Lake Superior region. It must be said to the credit of business men engaged in the lake trade that the great majority of them are opposed to unnecessary work on Sunday. All that is needed is sufficient agitation of the subject to enforce the laws against Sunday work, which exist everywhere. A few who are more greedy than others will be found in the lake trade as in other branches of business. Sunday work is not general on the lakes, but it would be so if it were not for the influence of the majority against it. There will be no united opposition, therefore, if the law is invoked against those who insist upon Sunday work. Let the leaders of this movement proceed by arresting the violators of the law. This is their only certain course of success. They will have the sympathy of the majority with them and will be opposed only by the individuals who are at fault.

Newspapers all over the country have devoted columns to accounts of the stranding of the United States protected cruiser Brooklyn, which struck a ledge of rock in the Delaware river, a few days ago, and damaged plating and frames in her bottom for a length of about 125 feet, admitting water into the double-bottom compartments under engine and fire rooms. A dozen such accidents, as far as the extent of bottom damages are concerned, are liable to occur to big steel steamers on the lakes, during a single season of navigation, without any special attention being given to them. Big steamers with practically their entire bottoms ripped and bent in all shapes, and with hundreds of frames broken, are hurried into dock, and hundreds of men—night and day forces—put to work on them. It rarely happens that these vessels are in dock for a period of more than about ten days. In the case of this big cruiser there will, of course, be considerable handling of guns, ammunition, stores, etc., in order to lighten her up so as to get her into dry dock, but the damage to her bottom is not sufficient to warrant the great fuss that has been made over it.

The Chicago Journal of Commerce credits the Review with the following: "Vessels now in commission on the great lakes are fast outnumbering the American craft engaged in the foreign trade. This is proven by statistics showing the number of vessels on the lakes to be 383, as against 247 on the Atlantic and gulf coasts, and 45 on the Pacific coasts. The tonnage of the lake vessels is almost 200,000 in excess of that of the salt-water boats." The figures in this item refer to vessels of 1,000 tons and over that amount. It is unfortunate that they have been quoted by one of the press associations and also by several trade publications. The lakes have more vessels of the 1,000-ton class—that is big freight vessels—than all other parts of the country combined, but it is well understood that there are more vessels of all kinds, big and small, on the Atlantic coast than there are on the lakes. Vessels of all kinds on the lakes number 3,333 of 1,324,068 gross tons, while the number of vessels of all kinds on the Atlantic coast is 16,786 of 2,667,314 gross tons. These figures are from the latest report of the United States commissioner of navigation.

Few vessels propelled by gas, naptha or electricity in this country are above 15 tons burthen, and it is not probable, therefore, that the duties or salaries of steamboat inspectors will be greatly increased on account of the number of vessels of this kind coming under their supervision in accordance with the law recently passed by congress. Neither will there be any great increase, on account of this law, in the number of new places open to pilots and engineers, as the act, in addition to excluding vessels under 15 tons, has reference only to such vessels as carry passengers and freight for hire. With an increase in the future, however, in vessels so propelled, the law may prove advantageous to pilots and engineers. One feature of the act will interest all owners of vessels of the naphtha and electric kind. It is provided, without regard to tonnage, that all must carry lights similar to those carried by steam vessels and must use the signals adopted for steam vessels when meeting and passing each other.

All of the disturbance in Detroit about the marine postoffice has served to direct attention to the fact that the river postoffice is not a Detroit affair; that where a few hundred vessel owners and shippers were interested in the limited private service of years past, there are now thousands of men in every branch of employment aboard ship, who stand ready to proclaim the benefits of a government service that assures to the humble deckhand the same security regarding his mail that is accorded to the letters or telegrams passing between the millionaire vessel owner and his captain. It is strange that J. W. Westcott and his friend, Congressman Corliss, could not see the effect—damaging on their side—that was certain to result from any opposition to improvment in this service. The opposition has brought out facts that are certain to insure liberal appropriations for the service in the future.

Following up the suggestions of the United States deep waterways commissioners, who recently made a report to congress, Senator Davis has introduced an amendment to the sundry civil appropriation bill providing for an appropriation of $150,000 for surveys and examinations of different routes over which a 20-foot canal may be provided from the lakes to the Atlantic seaboard.

Army and navy charts of the lakes are kept in stock by the Marine Review, Perry-Payne building.

Old Time Ships.

LISTS OF SIDE-WHEELERS AND SAILING VESSELS ON LAKE ERIE, 1835 TO 1840—NAMES OF MEN WHO WERE IN CHARGE OF THEM.

The venerable Capt. Barton Atkins of Buffalo takes considerable pride in records of early navigation on Lake Erie, which he has been collecting for a great many years past. Previous to 1842 there were few if any propellers on the lakes. Steam vessels were all of the side-wheel kind. Capt. Atkins has favored the Review with several lists of these steamers, noting in most cases the names of their officers. These names, both of vessels and officers, will be especially interesting to the older class of vessel men:

MASTERS AND MATES OF SIDE-WHEEL STEAMERS OPERATING ON LAKE ERIE IN 1840.

STEAMERS.	TONS.	MASTERS.	MATES.
Buffalo	613	Levi Allen	Fred S. Miller
Chesapeake	464	D. Howe	Elisha Boyington
Chautauqua	161	Simeon Fox	Hugh Jones
Cleveland	580	A E. Hart	
Constellation	483	Archie Allen	Peter Smith
Constitution		Wm. Brown	
Cincinnati	204	Peter Shainholdts	
Erie	497	T. J. Titus	Dennis McBride
Dewitt Clinton	413	A. H. Squier	Sam Vary (second)
Bunker Hill	457	D. P. Nickerson	John Maxfield
Commodore Perry	362	David Wilkinson	William Watts
Great Western	780	Augustus Walker	Wm. Caverly
James Madison	633	John McFadden	Wm. Davenport†
Milwaukee	401	Morris Hazard	James N. Lundy
Thomas Jefferson	428	Thos. Richards	Wm. Hinton
Sandusky	377	Geo. W. Floyd	Fred. S. Wheeler
New England	416	Charles Burnett	W. Kennedy
Rochester	472	C. H. Ludlow	Chauncey Stillman
Missouri	769	Thos. Wilkins	Ben. Wilkins
Wisconsin	490	Henry Randall	Wm. Pincheon
Fairport	259	Orson Sheperd	
General Wayne	390	Amos Pratt	
General Scott	240	Ira Davis	
General Macomb	175	S. F. Atwood*	
General Harrison	290	S. F. Atwood*	
United States	366	Lyman Case	
Vermillion	385	John Shook	
Star	138	Clifford Belden	
Robert Fulton	368	R. Hart	
Red Jacket	148	Wm. Caswell	John Huff
Rhode Island	148	James Morton	
Illinois	755	Chelsey Blake	Robert Wagstaff
Lexington	353	F. N. Jones	
Michigan	472	Walter Norton	Giles T. Baker
Julia Palmer	299	F. H. Freeman	

*Part of season in steamer Gen. Macomb and part in steamer Gen. Harrison.
†Luther Chamberlain second mate

ENGINEERS, CLERKS AND STEWARDS ENGAGED ON SIDE-WHEEL STEAMERS OPERATING ON LAKE ERIE IN 1840.

STEAMERS.	ENGINEERS.	CLERKS.	STEWARDS.
Buffalo	John Leonard		Patrick Healy
Chesapeake	Albert Harris	L. A. Kelsey	M. Cozzens
Chautauqua	Ira Holden	Ralph Courter	Geo. Blanchard
Cleveland	W. A. Cameron		
Constellation			Thos. Mellen
Constitution		Amasa Kingman	Wm. Alden
Cincinnati		Ed Hallenbeck	
Erie	Edgar Clemens	Lloyd Gelston	M. Joles
Dewitt Clinton	Frank Peugeot	James Gibson	A. H Gardner
Bunker Hill	Charles Williams	Richard Winslow	W. G. Corbett
Commodore Perry	James Moore	E. O. Hill	Harrison Chase
Great Western			George Ayers
James Madison	Richard Williams	John Moore	
Milwaukee	Alfred Harris	M. W. Dayton	Jerome Chase
Thomas Jefferson	R Hosford (Second)	L. L. Gibson	
Sandusky	Asa Whittemore	Chas. B. Rice	Chas Baylis
New England	Charles Radcliff		E. K. Bruce
Rochester	Ethan Rogers		B. Chatlin
Missouri			John Fleming
Lexington	W. E. B. Bennett		
Michigan	Timothy Battell	Hiram Baker	Sidney Mozier

Capt. Atkins had not been sailing long himself when the officers referred to above were in charge of steamers on Lake Erie. He was an assistant engineer on the Chesapeake during 1842 and part of 1843, and he gives the following as members of the crew of that steamer, other than those noted above: Second mate, Thomas Lester; second engineer, Wm. Fletcher; clerk, L. A. Kelsey; wheelmen, Henry Watts and James Hathaway; porter, William Patrick; other attendants, Andrew Lytle, Moses Dennison and Fred Low. Steamers out of commission during 1840 were: Columbus, Henry Clay, James Monroe, Daniel Webster, North America, Pennsylvania, Chas. Townsend, Sheldon Thompson, New York, General Vance, General Gratiot, Lady of the Lake, and General Porter.

Going back to earier days Capt. Atkins gives the following list of the principal steamers in commission on Lake Erie in 1835: Michigan, Capt. Chesley Blake; Thomas Jefferson, Capt. James Wilkins; Sandusky, Capt. T. J. Titus; Daniel Webster, Capt. Morris Tyler; General Porter, Capt. Walter Norton; United States, Capt. A. E. Hart; Charles Townsend, Capt. Simeon Fox; Pennsylvania, Capt. Levi Allen; Monroe, Capt. Harry Whitaker; Commodore Perry, Capt. David Wilkeson; Oliver Newberry, Capt. A. Edwards; William Penn, Capt. D. Wight; William Peacock, Capt. E. W. Pratt; North America, Capt. Gilman Appleby; Ohio, Capt. Charles Burnett; Detroit, Capt. R. Gillett; Delaware, Capt. C. Cobb; Victory, Capt. John Hebard; Caroline, Capt. ———; Thames (British), Capt. Van Allen; Governor Marcy, Capt. Saul Chase; Oswego, Capt. James Homans. John Leonard was engineer of the Jefferson; Horace Hungerford of the Webster; Wm. Bridgeman of the Victory; Geo. Beatty of the General Porter; Benj. Dorret of the Gov. Marcy; Al. Forbes of the Wm. Penn, and Alanson Hall of the Charles Townsend. Wm. Hinton was first mate and Luther Chamberlin second mate of the Thomas Jefferson; F. W. Clarke, mate of the Daniel Webster; Edmond Quirk, mate of the General Porter; Matthew Scoville, first mate and Bernard Lyman, second mate of the Charles Townsend; Fred S. Miller, mate of the Ohio. Some of the stewards were: Steamer Thomas Jefferson, John Fleming; Sandusky, Loomis Lyman; Daniel Webster, D. Butterfield; General Porter, Patrick Healy; Monroe, T. R. Wilcox; Ohio, C. B Rice.

In 1836 the following were among the principal Lake Erie steamers in commission: Superior, Capt. Pease; Ohio, Capt. Hart; Daniel Webster, Capt. Tyler; Sheldon Thompson, Capt. Walker; Enterprise, Capt. Niles; William Penn, Capt. Wight; Wm. Peacock, Capt. Wilkins; Niagara No. 1, Capt. Stanard; General Porter, Capt. Norton.

The sailing fleet of Lake Erie in 1835-1836 comprised the following: Brigs—Illinois, Capt. Robert Wagstaff, Mate Thomas Dingley, Second Mate Thomas Doyle; Indiana, Capt. Gust McKinstry, Mate William Baldy; North Carolina, Capt. Aaron Root. Schooners—Bolivar, Capt. C. H. Ludlow; Queen Charlotte, Capt. L. H. Cotton; Michigan, Capt. Wm. Dickson, Mate Orange Allen; Nucleus, Capt. Thomas P. Folger, Mate Edward Longley; Buffalo, Capt. Robert Hart; Telegraph, Capt. Peter Smith; Warren, Capt. George Montieth; Henry Norton, Capt. Jeremiah Oliver; Nancy Dousman, Capt. James Shook, Mate Charles Merrick; Marie Antoinette, Edward Macey; Huron, Capt. ———, Mate Charles Marsh; Panama, Capt. Richard Meeks, Mate Addison Pratt; Thomas Hart, Capt. Thomas Mellville; Daniel Webster, Capt. J. D. Moon; John Grant, Capt. John Nelson; Globe, Capt. Zepp Perkins, Mate Erastus Howard; Florida, Capt. N. K. Randall; Young Amaranth, Capt. J. W. Ransom; Hiram, Capt. Ezra Rathbun; John Adams, Capt. J. A. Barker; Alabama, Capt. Abner Smith, Mate Almond Robinson; Commerce, Capt. Reuben Smith; Cincinnatti, Capt. Wm. Dorret; Post Boy, Capt. Morgan Edgecomb; John Richards, Capt. R. Ferguson; L. Jenkins, Capt. Daniel Fuller; Ware, Capt. John Garnsey; Comet, Capt. Seth Green, Mate Henry Saulley; Marshal Ney, Capt. Lyman Harvey; La Porte, Capt. Benjamin Owen; Constitution, Capt. A. H. Squire; Columbus, Capt. David Clark, Mate Thad Meran; Dewit Clinton, Capt. Wm. Christian; John Adams, Capt. Wm. Cash; Ben Franklin, Capt. Saml. Blackley; United States, Capt. Edward Burke; Eclipse, Capt. John Berg; Hercules, Capt. Benjamin Boomer; Wyandotte, Capt. B. Black; Alert, Capt. Walter Atwell; Farmer, Capt. Hugh Soper, Mate Peter Larson; President, Capt. Ben Sweet; Navigator, Capt. James Thorpe, Mate Wm. Saltsman; Enterprise, Capt. W. S. Thorp, Mate Joe Sweetland; Benjamin Rusk, Capt. Agustus Todd; J. C. Spencer, Capt. Stephen Walker; Lewis Goler, Capt. John Warren, Mate Austin Kelley; Thos. Hart, Capt. David White, Mate Thos. Mellville; Col. Crockett, Capt. John Whitney; Phillips, Capt. Charles Howe; New Connecticut, Capt. Wm. Kennedy; Agnes Barton, Capt. J. G. Ludlow; Duke of Wellington, Capt. John Medler, Mate Wm. Johnson; New York, Capt. ———, Mate John Nelson.

At the annual meeting of the Brotherton Iron Co., held in Milwaukee a few days ago, the old officers with the exception of Mr. J. B. Stubbs of Cleveland were re-elected as follows: President, Joseph Sellwood of Duluth; vice-president, H. Niedecken of Milwaukee; secretary, Edward Niedecken of Milwaukee; treasurer, M. J. Luther, Streator, Ill.; directors, Joseph Sellwood, H. E. Niedecken, M. J. Luther, J. H. Jones of Racine; Richard Bawden, Bessemer; Arthur Pugh, Racine. It is expected that the mine will be opened up again about April 1.

Miscellaneous Matters.

Edwin D. Cowles, lumber statistician of Saginaw, has prepared a report showing a great falling off in the lumber output of Michigan during 1896. The output last year as compared with 1895 shows a decrese of 565,000,000 feet, and a decrese of 1,565,000,000 as compared with the output of 1892. At the close of the manufacturing season there was on hand 1,140,316,185 feet of lumber, only 12,000,000 feet less than the quantity on hand at the close of 1895, although there was a falling off in production of nearly 600,000,000 feet.

At the bottom of deep bodies of water, such as the principal oceans and lakes, there is a total absence of light, as far as sunlight is concerned, and there is an enormous pressure, reckoned at about one ton to the square inch in every 1,000 fathoms, which is 160 times greater than that of the atmosphere we live in. At 2,500 fathoms the pressure is thirty times more powerful than the steam pressure of a locomotive when drawing a big train of cars.

The annual banquet and ball of the Marine Engineers' Beneficial Association of Cleveland, held Wednesday evening, was pronounced fully as successful as any of the numerous social gatherings held by the engineers in the past.

It is probable that the life saving station at Cleveland will be removed to the lake front during the coming season. The change is necessitated on account of the plans for widening the river which will soon be carried out by the city.

Directors of the Cleveland & Buffalo Transit Co., elected Tuesday, are: M. A. Bradley, George Gardner, D. Shurmer, H. D. Goulder, Geo. W. Avery, R. C. Moody, and T. F. Newman, all of Cleveland.

Capt. Samuel Neff of Milwaukee purchased the schooner D. S. Austin from the United States marshal at Milwaukee, Tuesday, for $2,550.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes, Jan. 30, 1897:

	Wheat, bushels.	Corn, bushels.
Chicago	12,171,000	6,413,000
Duluth	3,494,000	11,000
Milwaukee	315,000	4,000
Detroit	315,000	105,000
Toledo	1,120,000	639,000
Buffalo	1,768,000	112,000
	19,183,000	7,284,000

As compared with a week ago, the above figures show, at the several points named, a decrease of 312,000 bushels of wheat and an increase of 72,000 bushels of corn.

Major Clinton B. Sears of Duluth, who is in charge of river and harbor works on Lake Superior, opened bids, Saturday, for repairs to the breakwater at Agate Bay, Minn. The repairs involve the use of about 43,000 feet, B. M., of timber and about seventy cords of stone. Samuel Meniece of Duluth was the lowest bidder at $1,138.75. Bids from other contractors, all of whom reside in Duluth, were: John Somerville, $1,288; Porter Bros., $2,009.50; A. & D. Sang, $1,680; John Shulene, $1,280.65; Tulloch Bros. & McGee, $2,570.50. William McCurdy of Houghton, Mich., and Alex. McCurdy of Duluth submitted a joint bid of $1,575.50. On another job involving repairs to the canal piers at Duluth, for which bids were opened by the same officer, Monday, Samuel Meniece was also the lowest bidder at $525.25. Other bidders on this work were J. W. Preston, John Somerville, Tulloch Bros., F. P. Tims, J. B. Wanless & Co., David Hood and John Shulene, all of Duluth; also Whitney Bros. and Lewis G. Moran of West Superior.

On the opening of navigation two fixed lens lantern lights (instead of three lights, as heretofore), one white vertically above one red, will be established in the structure recently erected near the shore line, west of and adjoining the inner end of of the west pier, entrance to Ashtabula harbor. The new structure replaces the temporary structure erected in November, 1895. The focal planes of the lights will be, respectively, 62 feet and 68 feet above mean lake level. The structure is a square, red, pyramidal, inclosed tower, surmounted by an octagonal lantern with a copper roof.

Large Independent Air Pumps.

What is claimed to be the largest marine air pump in the world is one constructed on the Blake "twin" system, and designed by the George F. Blake Mfg. Co., New York city, for the new North German Lloyd steamer Kaiser Wilhelm der Grösse, which was built and is being fitted out at the Vulcan Iron Works, Stettin, Germany. It will be remembered that during the marine exhibition at Kiel the United States cruiser New York excited considerable interest among marine engineers and naval architects all over the world. Among the auxiliaries of this ship that were favorably commented upon were the independent air pumps of the Blake vertical "twin" system, and the Germans were so favorably impressed with these pumps that several of their cruisers have since been fitted out with them.

This pump is compact and simple in design. It has two double-acting steam cylinders, 18 inches in diameter, and two single-acting air cylinders, each 44 inches in diameter, the stroke being 24 inches. There are two pumps of this size on the Kaiser Wilhelm der Grosse and they have a capacity at moderate speed sufficient to take care of the main engines when the latter develop 28,000 horse power. When these pumps were tested at the works of the George F. Blake company, some months ago, they formed a vacuum of 28¾ inches with temperatures of vapor and condensed steam at about 80 degrees Fahr., with the pumps working at a very moderate speed. The pumps were run up as high as 75 double strokes per minute, and operated as smoothly and quietly as they did at the rate of one double stroke per minute, Although they were not bolted to the floor, they worked without any vibration, showing that the working parts were well balanced and that the machine is perfectly self-contained. Although the Blake vertical "twin" system has shown an economy on the United States cruisers and battleships averaging about ⅛ of 1 per cent. of the I. H. P. of the main engines, it is fully expected that the big air pumps for the new North German Lloyd steamer will break the record in the matter of economy. It is calculated that they will not require less than 1-10 of 1 per cent. of the I. H. P. of the main engine. The Blake company also fitted out the same steamer with an equipment of feed, fire and bilge pumps of its improved vertical type.

Mr. E. T. Chamberlain, United States commissioner of navigation, has issued, as a supplement to his annual report for 1896, a discussion of the question of discriminating duties. In view of the attention that is now directed to the matter of protection for American shipping, this document will prove interesting, no matter what may be said of the merit of arguments advanced by the commissioner. He seeks to prove mainly that the purpose of the United States in the early years of their existence in imposing discriminating duties was to retaliate against foreign nations which imposed discriminating duties on vessels of the United States. In support of this claim he quotes from congressional records at various periods for nearly a hundred years past, showing that the foremost statesmen in all parties recognized that discriminating duties involve a system of commercial warfare, and that retaliation is not confined to shipping, but is likely to include heavy customs penalties on our principal exports.

In adopting resolutions recommending some measure of legislation to encourage American shipping, members of the National Association of Manufacturers, who were assembled in Philadelphia recently, showed good judgment by refusing to endorse any of the several bills with this end in view that have been before congress of late. The manufacturers simply say in their resolutions that they are pleased and satisfied with the attention that has been given lately by the American people and by President-elect McKinley to the need of protecting American ships in the foreign trade, and express the hope that under the forthcoming administration this long deferred revival of the American merchant marine "will be patriotically, zealously and immediately undertaken, so that American foreign commerce may hereafter and forever employ ships built, owned and manned by Americans."

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Pittsburgh take Pennsylvania No. 10, "The Flyer." Leaves Union station 8 a. m. daily, Euclid avenue 8:10 a. m.; arrives Pittsburgh 11:30 a. m. Solid vestibuled train, Pullman Buffet Parlor car attached to train. Apl 15*

*The Review has excellent photographs of lake ships.

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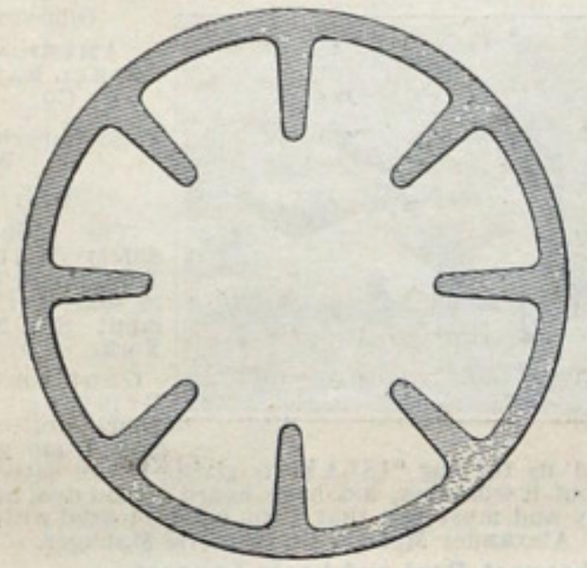
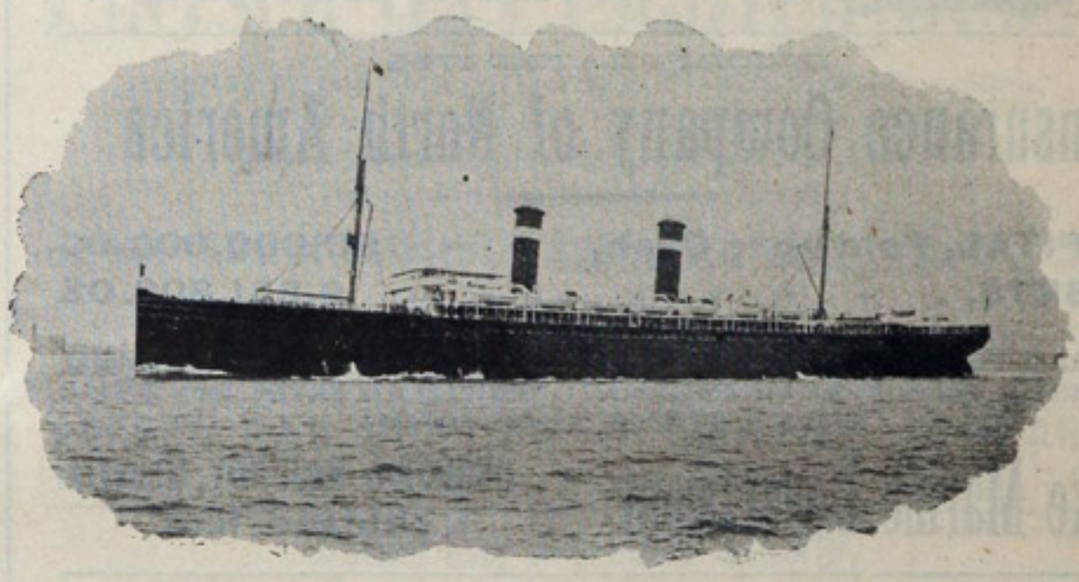
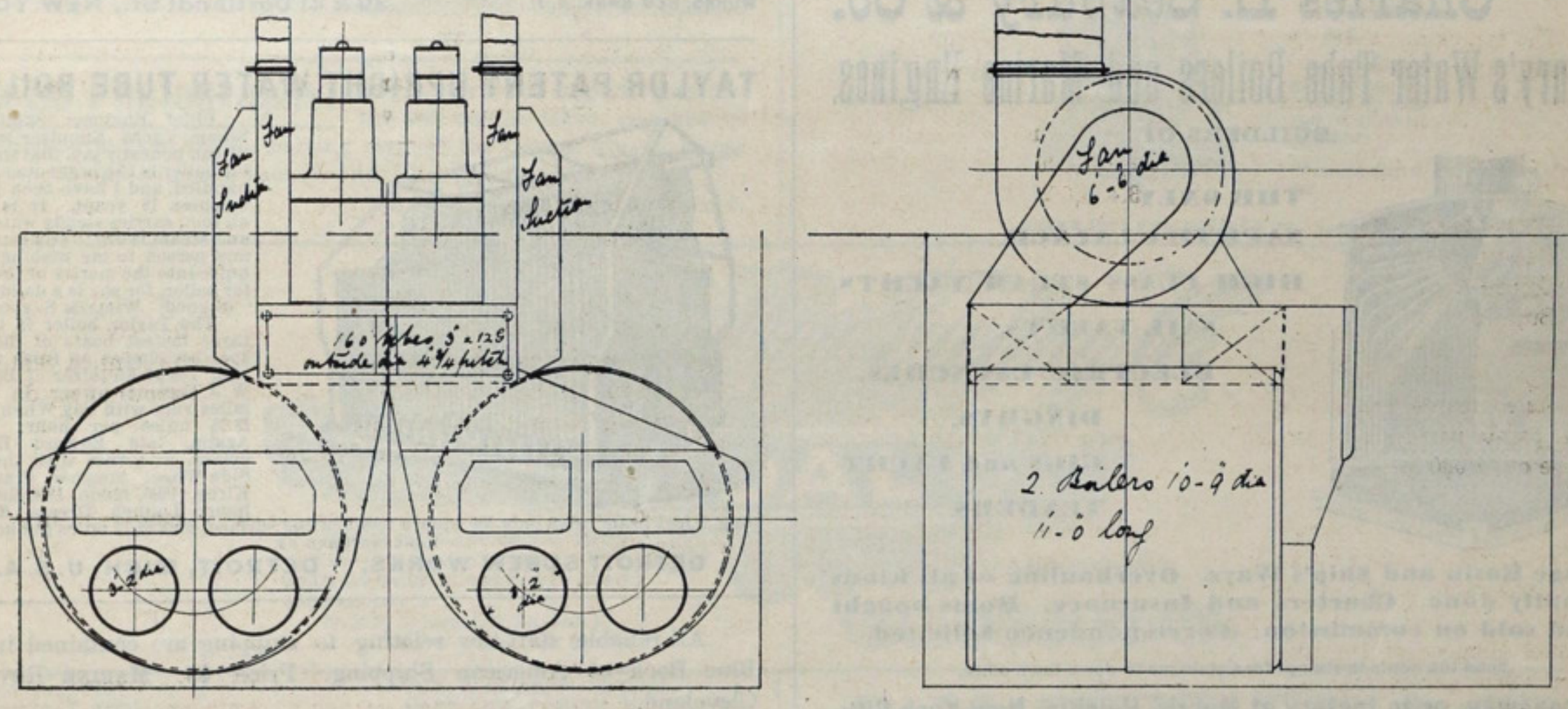


SERVE'S RIBBED TUBES.

Managers of the Trans-Atlantic lines are watching the performance of the steamer on the right, because she burns only 1.22 lbs. coal per horse power per hour. Her boilers are fitted with the tubes shown on the left.



AMERICAN LINER ST. PAUL.



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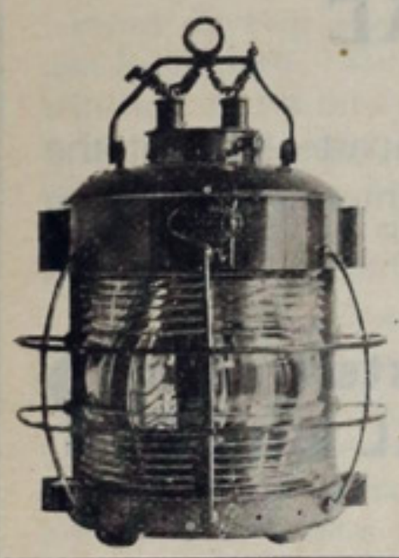

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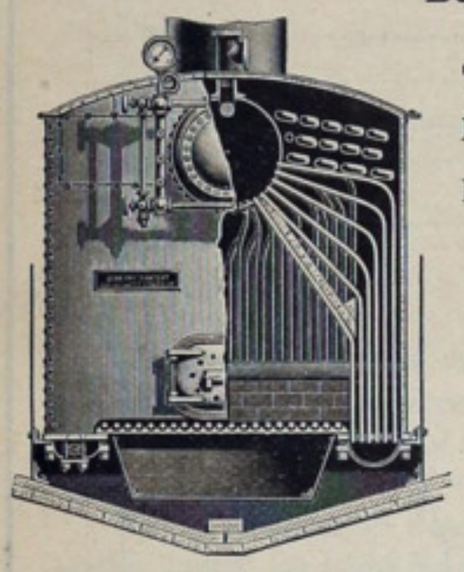

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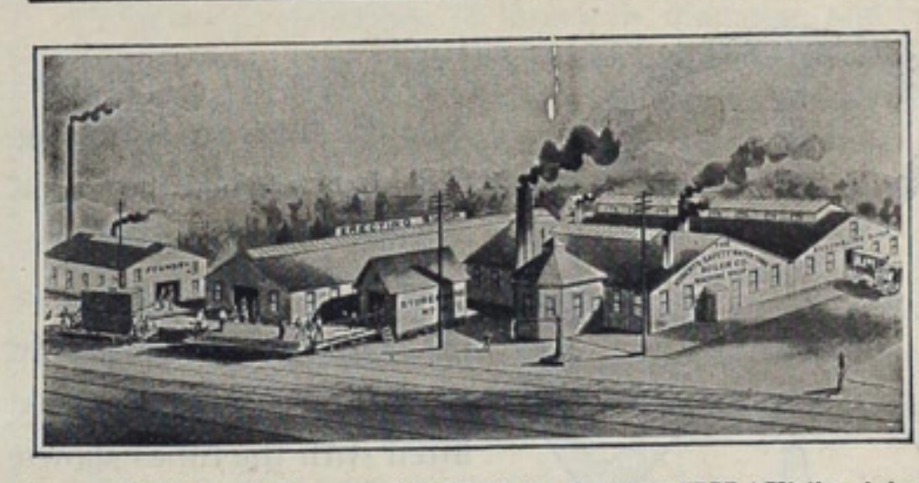

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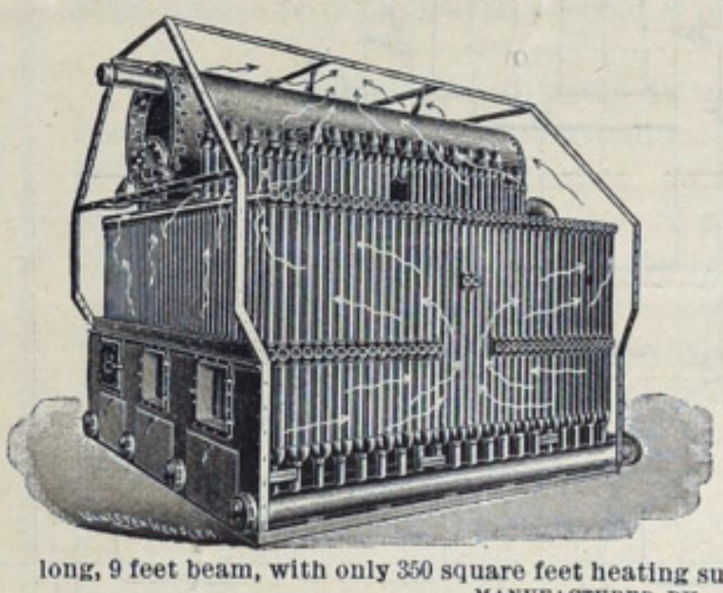

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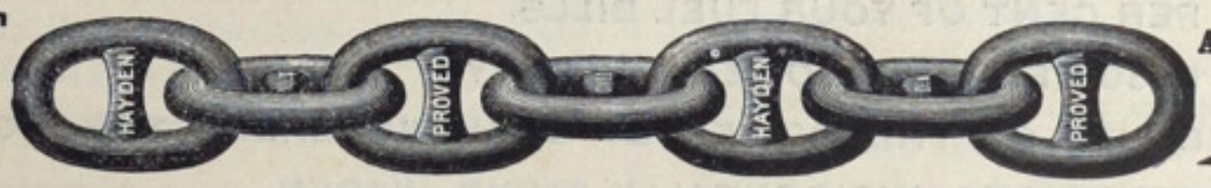

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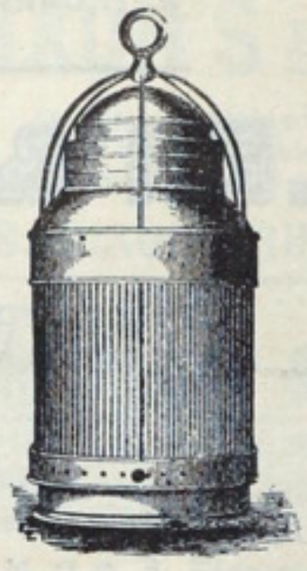

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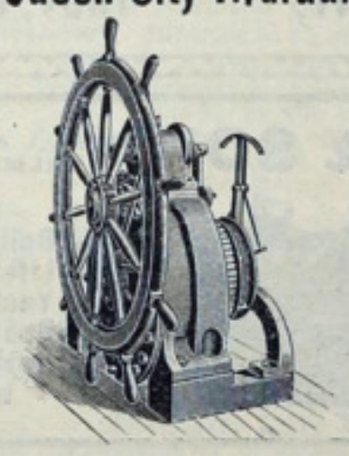

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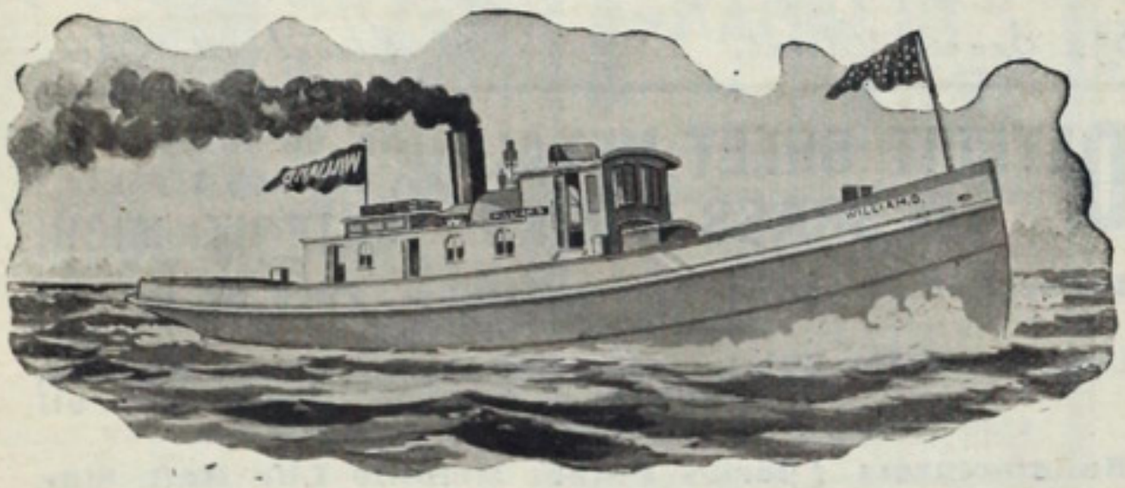

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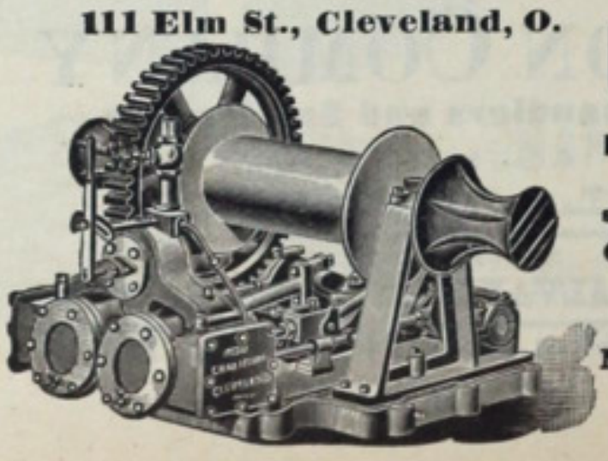

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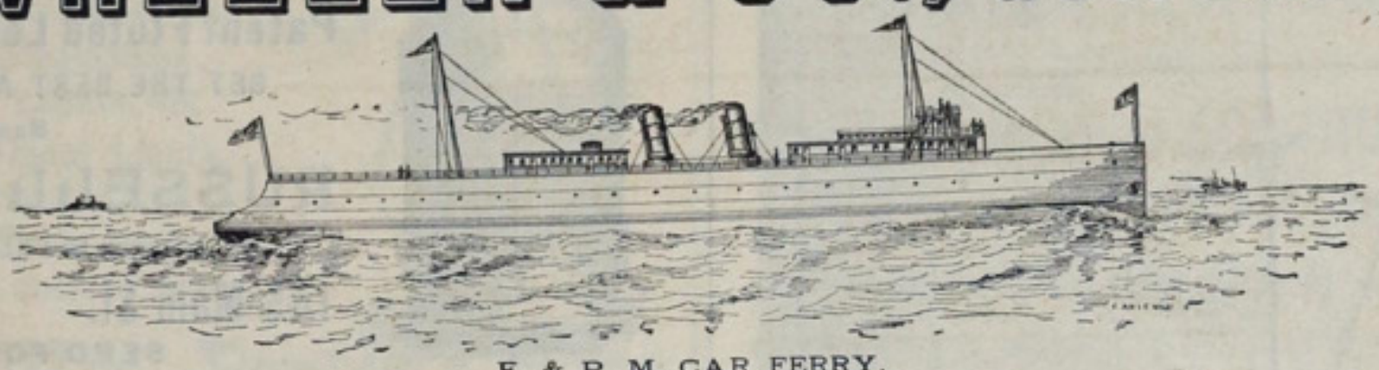

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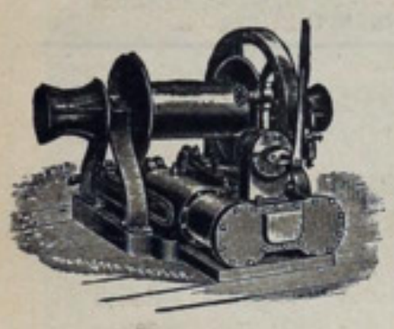

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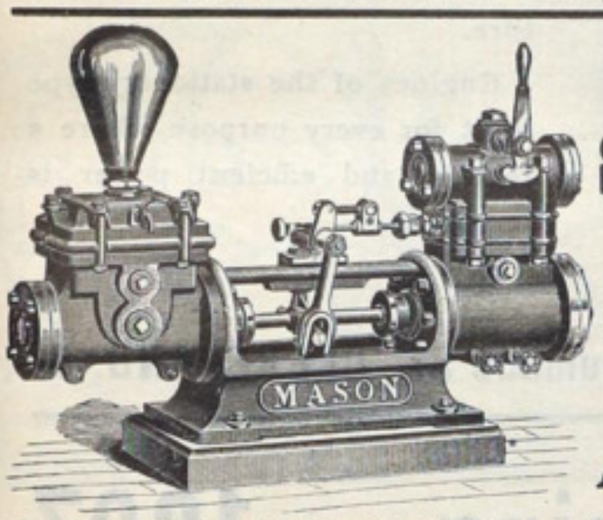

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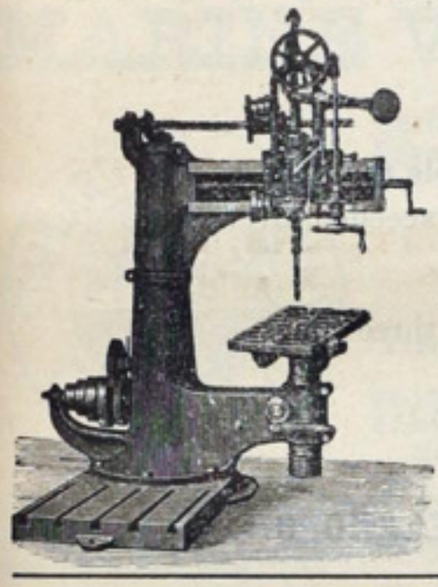

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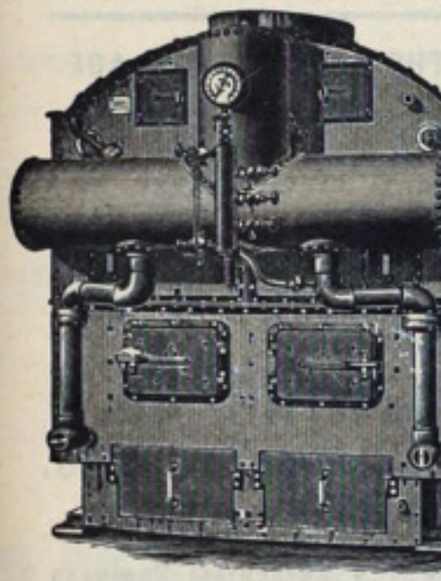

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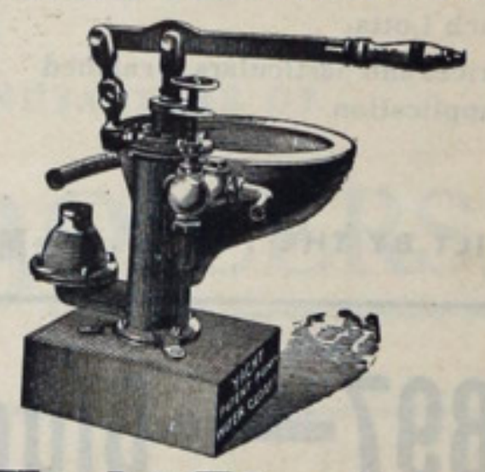

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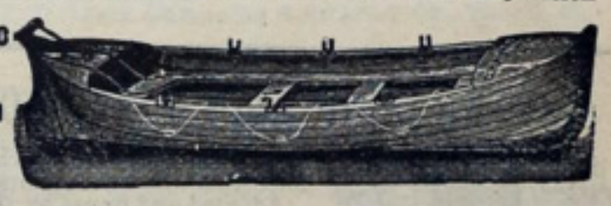

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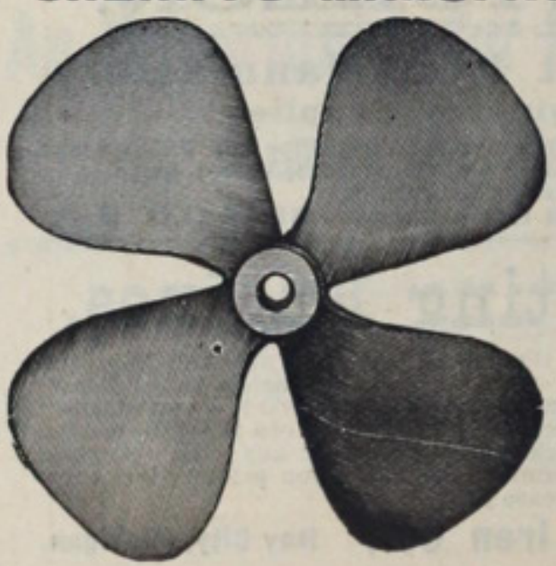

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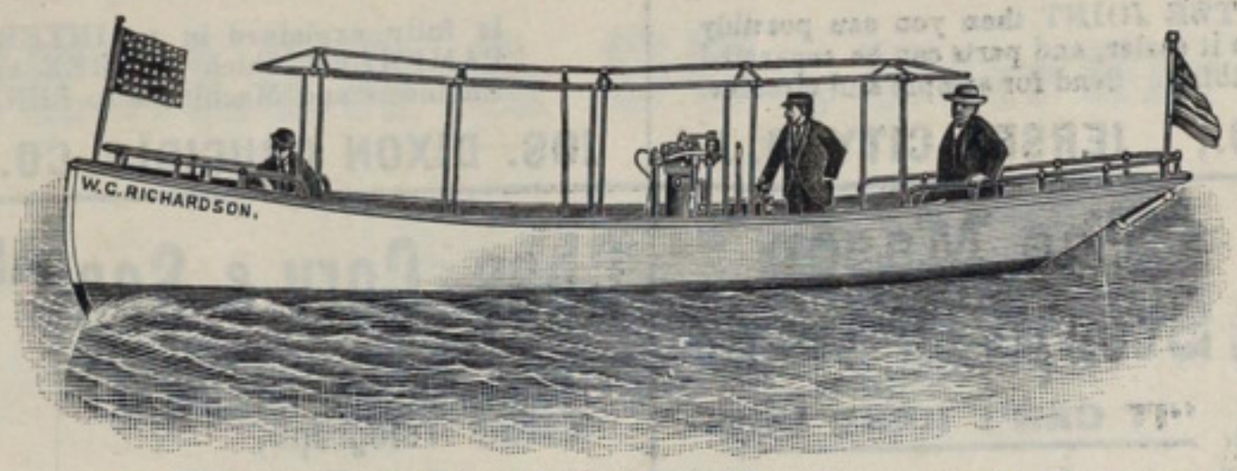

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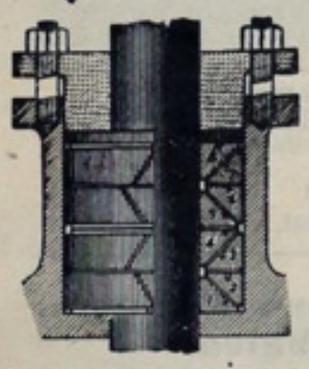

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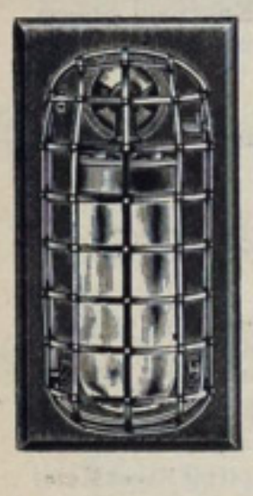

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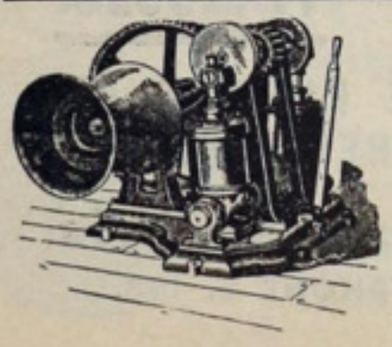

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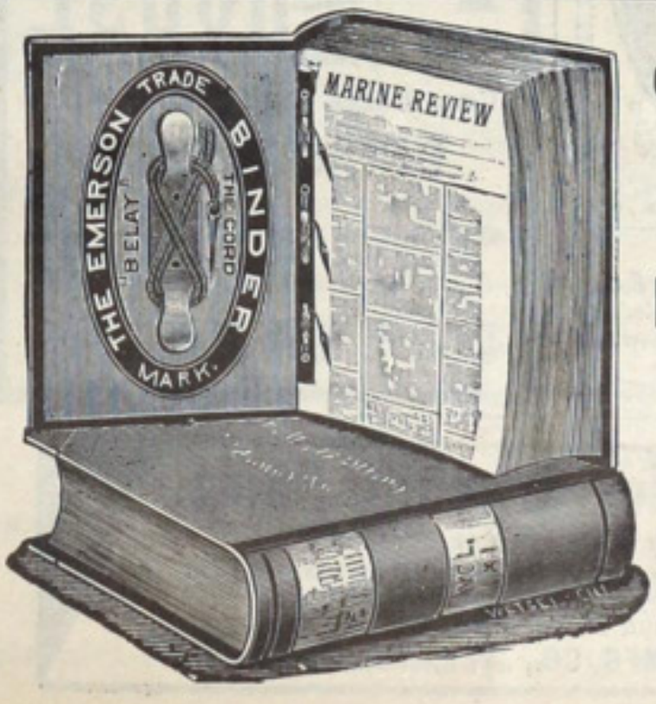

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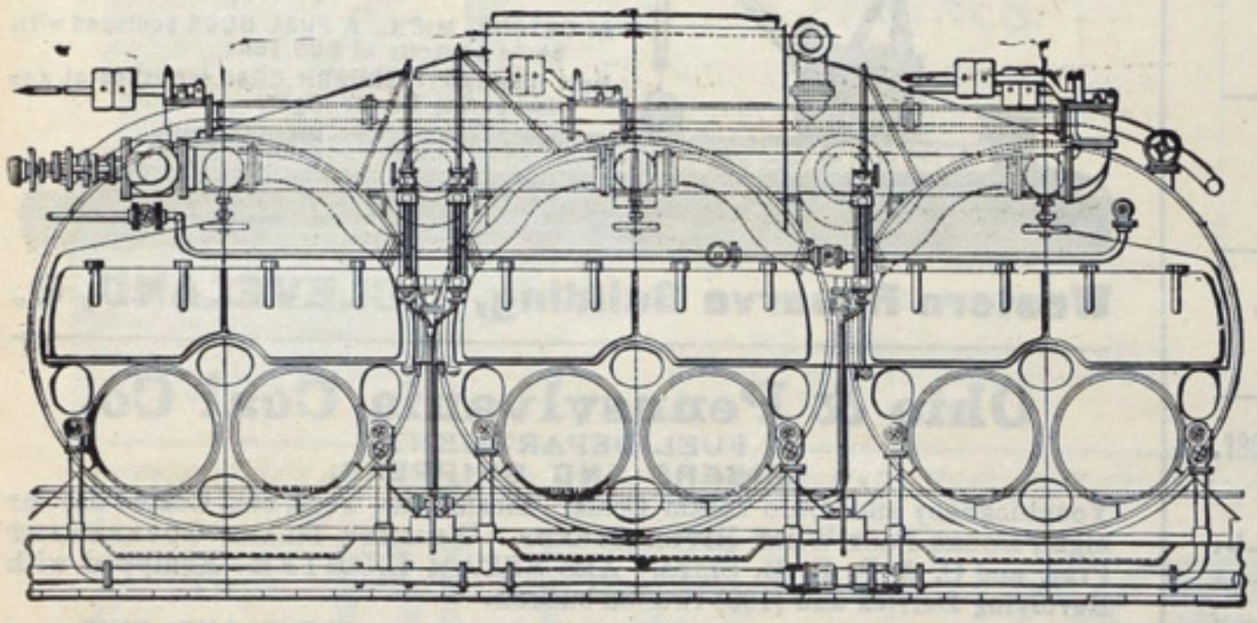

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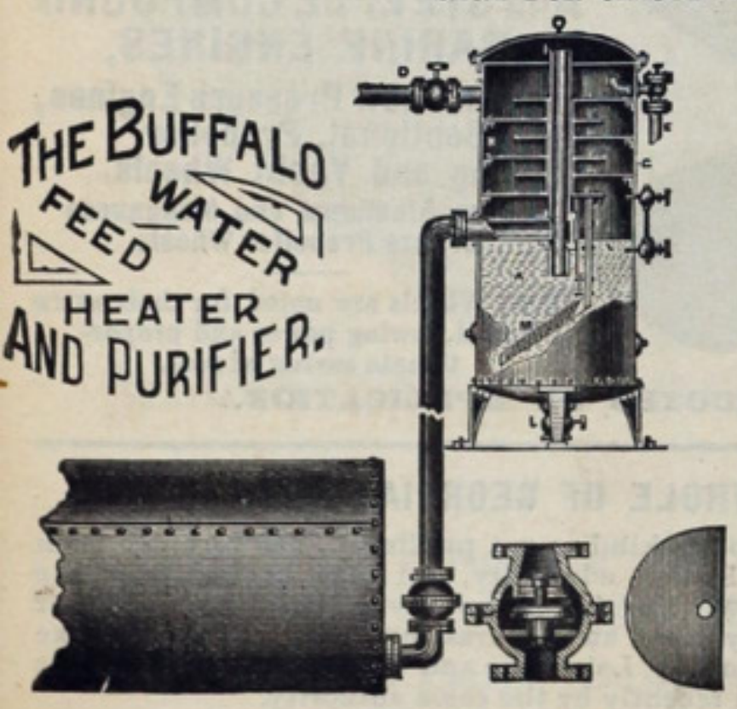

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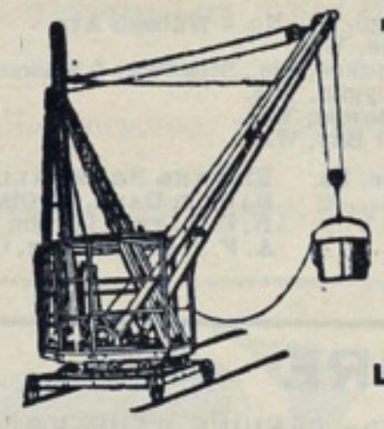
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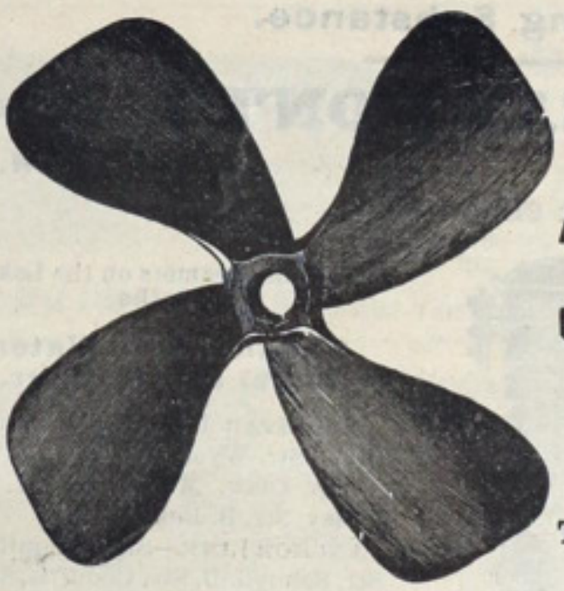
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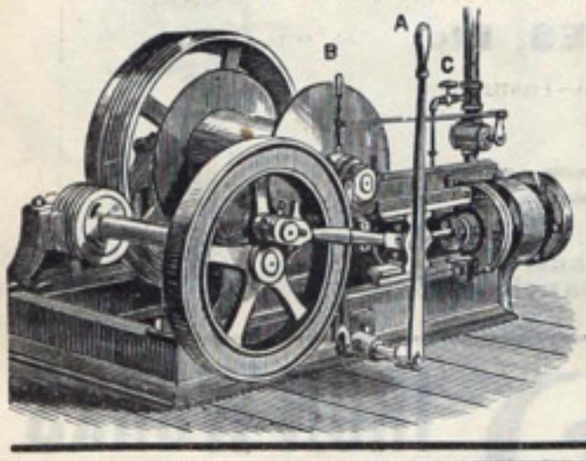

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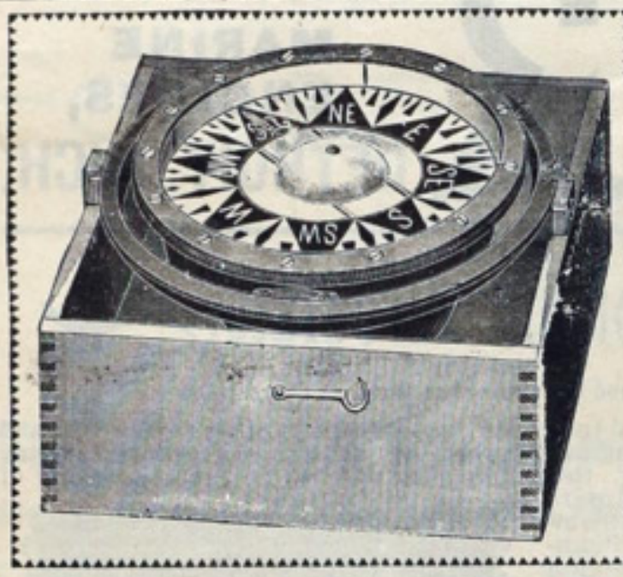

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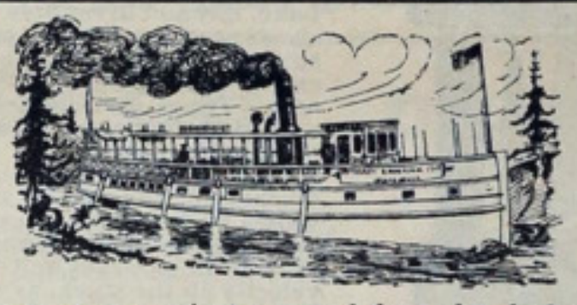

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These beautiful twin steamers just removed from dry dock. Hulls of heavy oak and in first class condition, recaulked, repainted, refitted, new stacks, new large wheels, large engines, increased speed and each boat fully equipped with metal rafts, life boats, life preservers and fire pumps. Licensed to carry 200 passengers each, and built for both lake and river navigation. Cabins, single deck, twin screws, two sets engines each. Boilers better than new. Length 80 ft., beam 19 ft. Built in 1891. Original cost $19,000; to be sold outright. *No lease or trade.* Now laying at Detroit, Michigan, and can be seen at W. H. Oades ship yards. Address,

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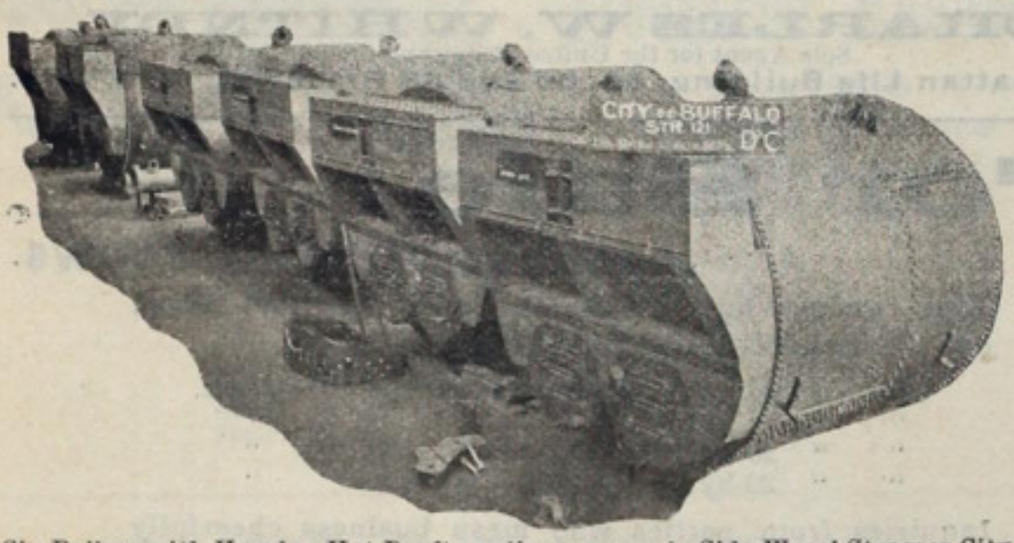

Six Boilers with Howden Hot Draft appliances now in Side-Weeel Steamer City of Buffalo. Dimensions of each boiler—12 ft. 6 in. diameter by 12 ft. length.

ECONOMY in operating expenses on Lake Ships must come from reduced coal bills. No great saving can be made in labor cost, and provisions are already low. But fuel bills can be lowered and cheap coal used to advantage by adopting Modern Methods of making steam at low cost.

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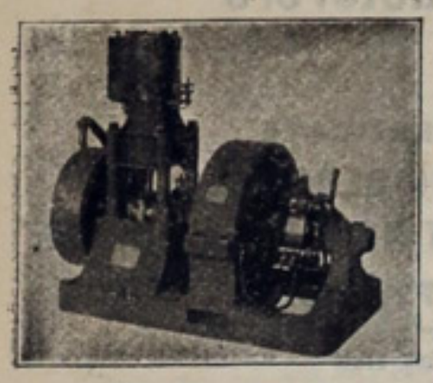
Now in use on Lake Steamers aggregating over 40,000 Horse Power.

CAN BE APPLIED TO OLD SHIPS AS WELL AS NEW ONES.

No complicated machinery. Cool engine rooms and cool fire holds. Estimates readily furnished for application of this draft to any steamer.

DRY DOCK ENGINE WORKS, DETROIT, MICH.



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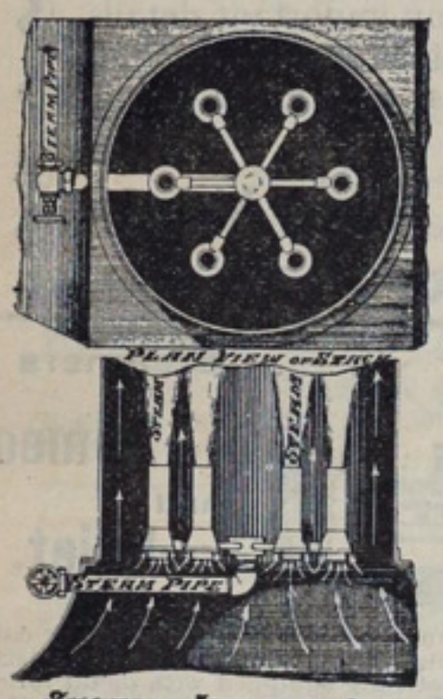


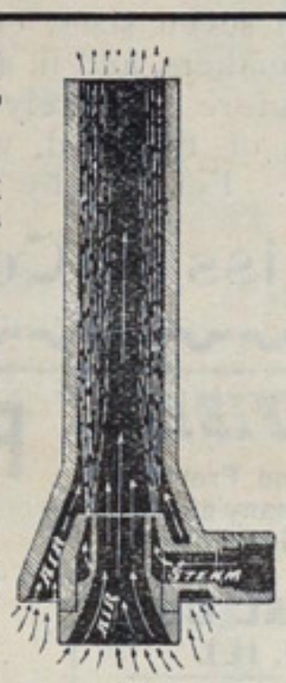
SECTION VIEW OF STACK SHOWING JET IN OPERATION.

The Annular Steam Jet

For Smoke Stacks of Steam Boilers.

Acknowledged as the most powerful and economical jet on the market, giving results equal to forced draft with fan. Works well at all steam pressures.

In use on the fast Sound Steamer City of Lowell and famous Delaware River Strs. City of Chester and Brandywine, together with several Cuban and Mexican Strs. Also many Steamships, Side Wheel and Propeller, Lake, Bay and River Strs. Cut on the right shows sectional view of castings, which are spaced at equal distances throughout the stack, making an equal subdivision of its area. These castings are attached to pipes radiating from a central casting attached to steam pipe, as shown on the left. Steam is supplied through these pipes to each casting discharging through an annular opening, as shown by dotted lines, causing a current of air and gases to flow through the central and outside air passages, and discharge at a high velocity up the stack, as shown by arrows. Prompt delivery of orders guaranteed.



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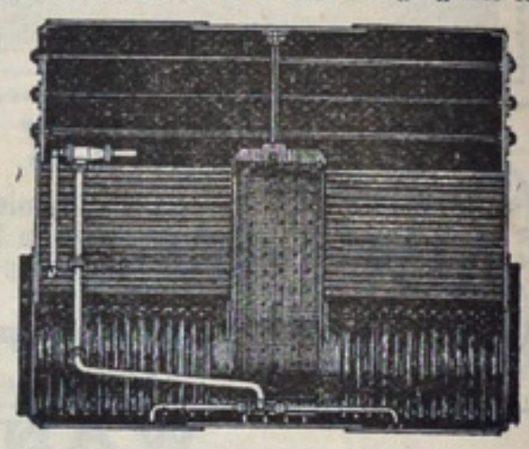
For Heating and Circulating the Water in Steam Boilers.

Equalizes expansion and increases evaporation, thereby saving coal and preventing leaks, thus saving cost of repairs. Prevents foaming or priming and pitting, thus increasing safety and prolonging life of boiler. In use on the International Nav'n Co's Steamers Paris, Southwark, Pennsylvania and Illinois; Steam Ships Gloucester and Howard of Merch'ts and Miners Line; Sound Steamers City of Lowell and Richard Peck; fishing steamer Al. Foster; Delaware River Steamers City of Chester and Brandywine; and many steam yachts and tug boats, giving remarkable results. Used by Harlan & Hollingsworth Co., Bath Iron Works, Maryland Steel Co., and others. Castings carried in stock for prompt delivery.



Circulating Apparatus in Boilers of the Ocean Greyhound Str. Paris.

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Steel Forgings of all descriptions

For **Marine Engines**

Fluid Compressed, Hollow, Hydraulic Forged and Annealed Forgings a Specialty.

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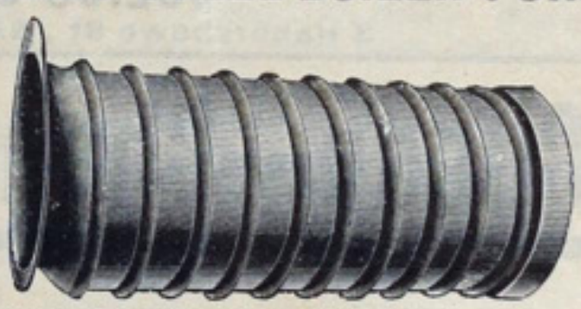
PURVES' RIBBED STEEL BOILER FURNACE FLUE.

BACK END.



FRONT END.

With this style of Furnace Flue, the rivets at the "back end" are out of the line of fire, and all that has to be done to remove it is to cut out the rivets at the ends and slip it through the front; and to replace it, simply to slip it back in its place and rivet up the ends again without disturbing any other part of the boiler. No smith work is required to fit it in a boiler or to refit it when replaced. It is ready for use as it comes from the manufacturers. This style of Flue has been in use six years without a single complaint.

Over 16,000 of Purves' Ribbed Steel Furnace Flues in successful use in Marine Boilers.

ELLIS & EAVES SYSTEM OF INDUCED OR SUCTION DRAFT.

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DREDGES, TUGS and SCOWS.

Two Dredges and six Dump Scows, one Flat Scow, one Derrick Scow and four Tugs—

One	with	15 by 17	engine,	allowed	110	lbs.	steam.
"	"	17 by 16	"	"	110	"	"
"	"	20 by 22	"	"	125	"	"
"	"	20 by 24	"	"	110	"	"

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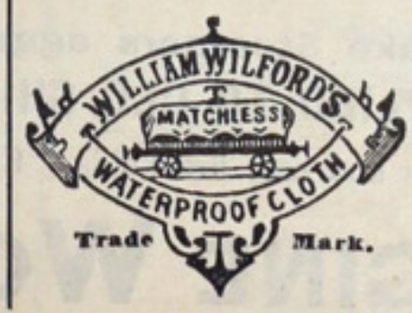

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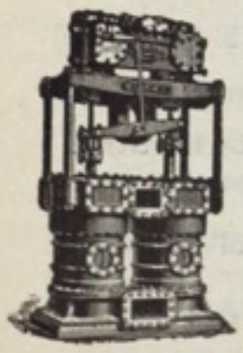

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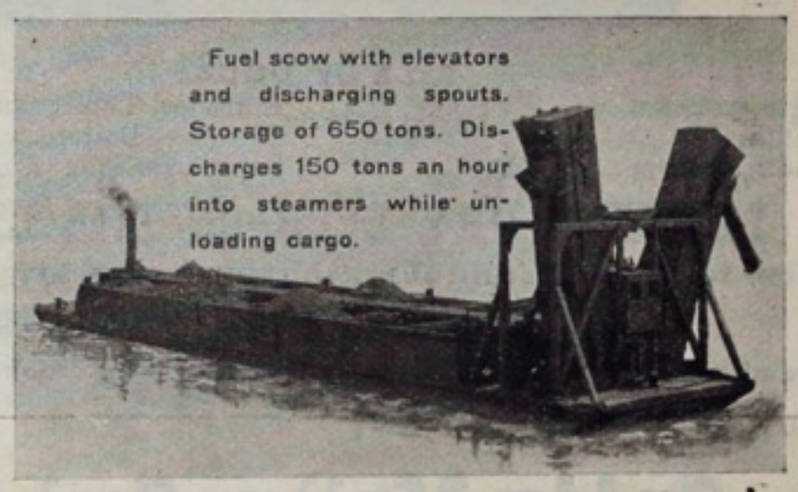
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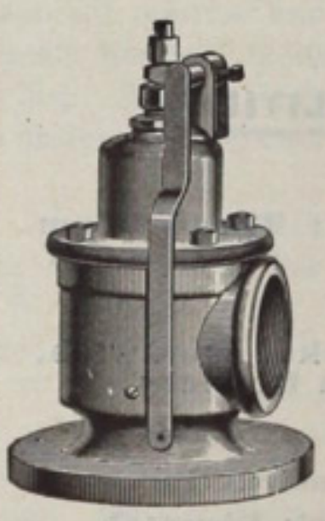

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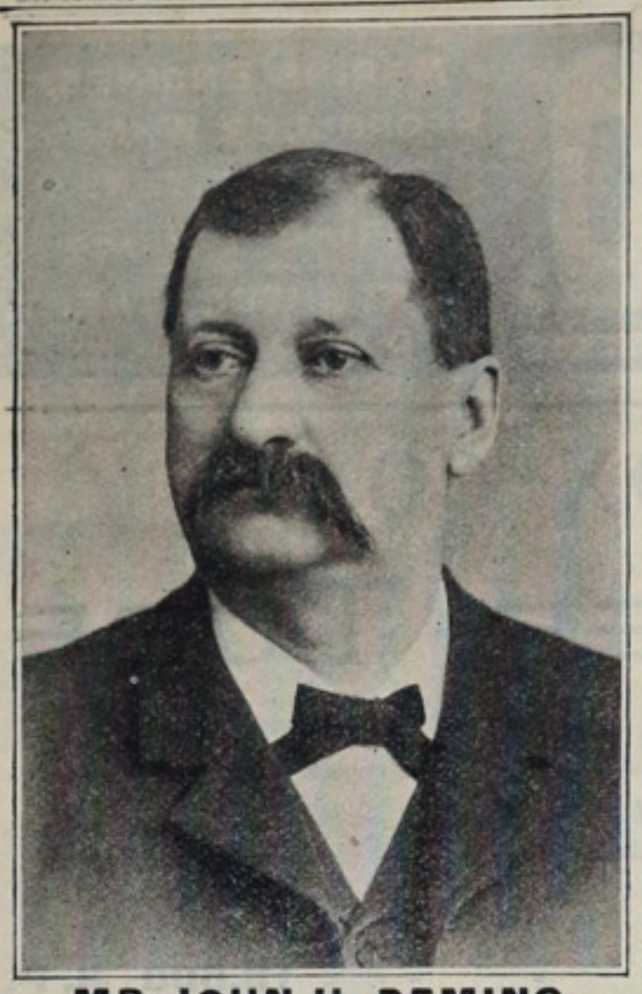

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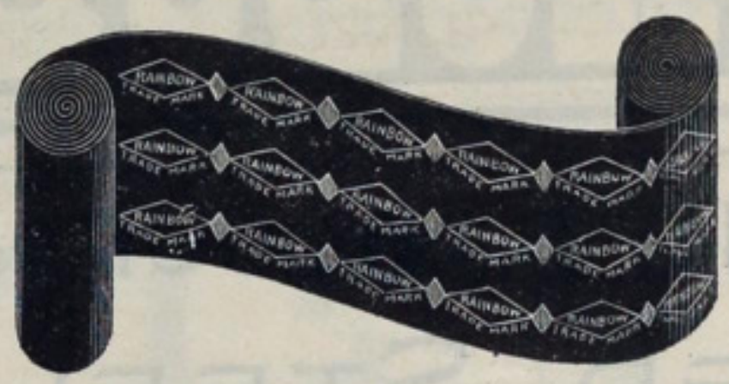

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Can't blow it out.

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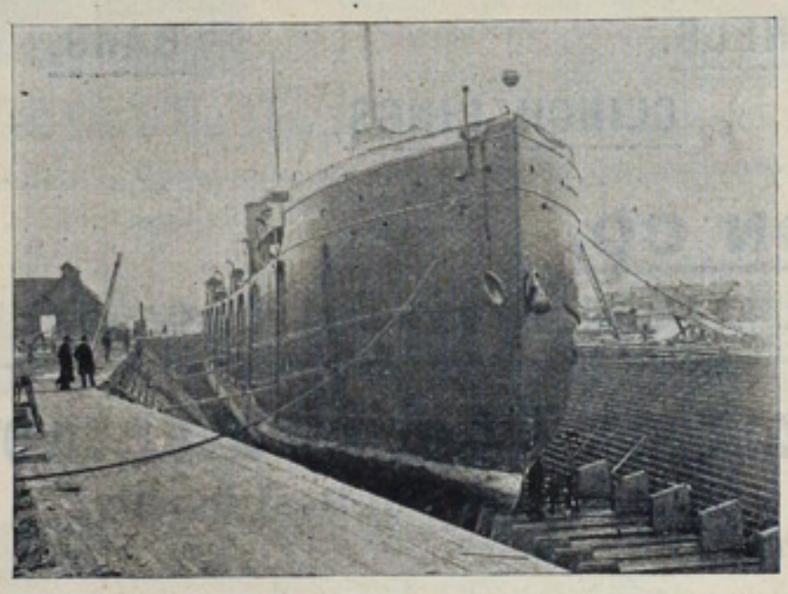

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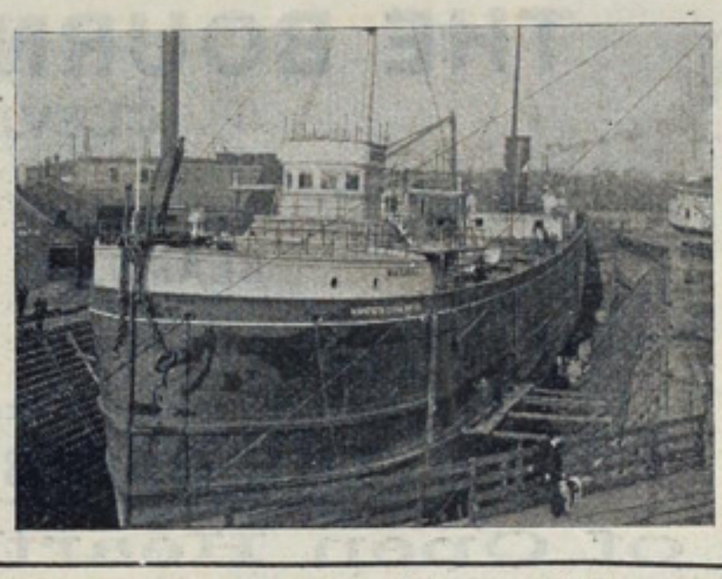

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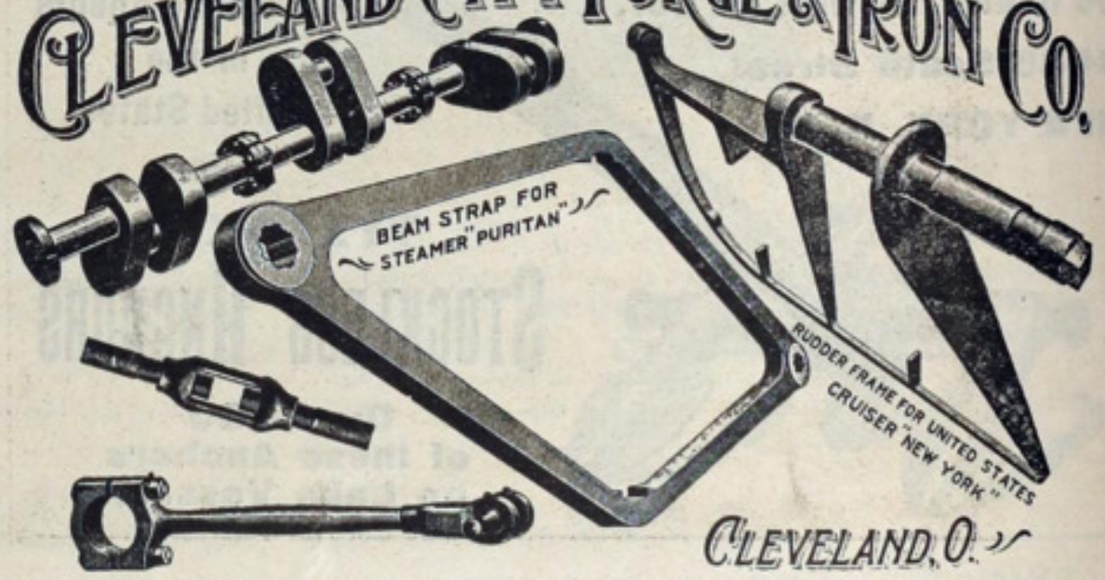

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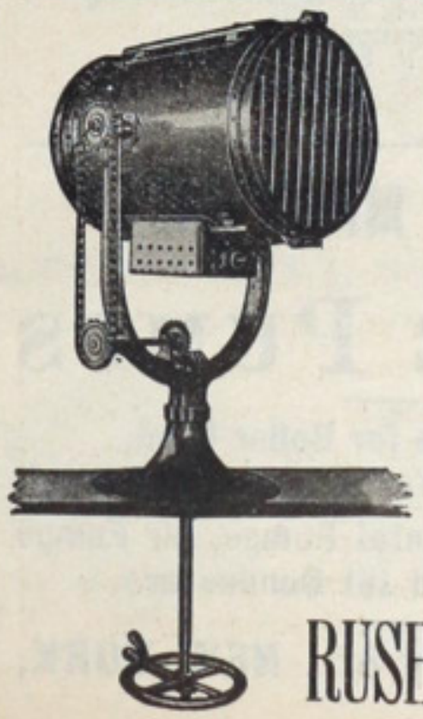

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